

THE IRON AGE

AUGUST 6, 1936



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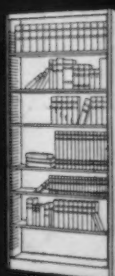
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2—THE IRON AGE, August 6, 1936

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THE IRON AGE

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Indexed in the Industrial Arts Index.

Published every Thursday. Subscription

Price: United States and Possessions, Mexico, Cuba, \$6.00; Canada, \$8.50, including duty; Foreign

\$12.00 a year. Single copy, 25 cents.

Cable Address, "Ironage, N. Y."

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AUGUST 6, 1936

ESTABLISHED 1855

Vol. 138, No. 6

MY WILL BE DONE

It is not often that an accurate character sketch can be written in just four words, but it has been done twice, at least, during the past 160 years.

The first time it was done was when Marie Antoinette gave the world and France in particular a complete character sketch of herself in the words "Let them eat cake."

The second time that it was done was but a few days ago when President Roosevelt, at Eastport, Maine, told the assembled citizens: "Quoddy *will* be completed."

"Quoddy," you remember, is the fantastic Passamaquoddy project, sponsored by the President and intended to harness the tides of Maine. It was to cost \$30,000,000 or more; an initial investment that merely from the interest standpoint would make it impossible to produce electricity at reasonable cost. Moreover, even if the scheme worked technically, there was no need nor market for this additional power in this non-industrial region.

Quoddy, like the Florida ship canal, was such an obvious engineering fantasy that it was "turned down" by impartial engineering boards. Even Secretary Ickes, who can swallow much, could not stomach it. And the Congress of the United States refused to sanction the expenditure of more funds for its completion.

You *shall* have Quoddy.

What is a little thing like the will of the people, expressed through their representatives in Congress, to stand in the way of a Presidential desire or command? The Constitution has not stood in its way, how can mere Senators and Representatives expect to?

Quoddy itself is of little import to a great country such as ours. But the President's words concerning it are of great import to all of us. Echoing back from the rock bound coast of Maine, they reverberate from coast to coast.

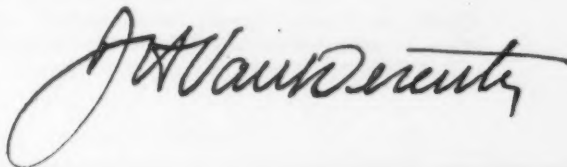
You shall have Quoddy.

You shall have the NRA.

You shall have the AAA.

You shall, in spite of Congress and Constitution, be made to accept the regimentation and centralization set forth in the New Deal philosophy before I get through with you.

Take it and like it.



.....PROGRESS IN ELECTRIC

By H. M. WEBBER

Industrial Department, General Electric Co., Schenectady



WITH the current increase in metal-working activity, use of the electric - furnace - brazing process has increased apace. Within recent months two outstanding applications of the process were described in *THE IRON AGE*—furnace brazing of the RCA metal radio tubes, and the Lake Erie Chemical Co.'s new tear-gas shell. In this article a few more of the recent applications are reported. These new uses, like the others, are not only interesting, but indicative of the progress being made in the art.

The Eaton Detroit Metal Co., with brazing furnaces installed in its Detroit and Massillon, Ohio, plants, is making a number of electric-furnace-brazed subassemblies of stampings and screw machine parts for automobiles and refrigerators. Copper-brazed parts come from the brazing furnaces clean and bright with smooth copper fillets at the joints. Not only do the products have appeal from the appearance standpoint but other advantages including lightness in weight, great strength and rigidity, and tight joints.

Fig. 1 shows some gas tank flanges which are made for automobiles and tractors. Although the ones illustrated are made by the electric-furnace-brazing process, such assemblies are also made in a number of other ways among which are torch-welding, torch-brazing, or soldering of stampings, or casting the whole from malleable cast iron. Objections to these methods include oxidation from

localized heating in air, presence of hard-to-remove collections of flux which eventually get into gasoline pumps, or great weight which might cause failure of some sections of the flange or gas tank due to vibration. The electric-furnace-brazed flanges, however, being heated and cooled in a controlled atmosphere are clean and bright and are free from oxides or flux deposits. They are light in weight and have great resistance to vibration, and long life.

To prepare the parts for the electric - furnace - brazing process, copper wire of an ordinary commercial grade is tied around the parts near the joints to serve as the brazing metal. The assemblies are then loaded in trays and passed through box-type or conveyor-type furnaces operating at about 2100 F., in which the parts are heated above the melting point of copper and then passed out into the adjoining water-jacketed cooling chamber. The molten copper wets the surfaces of the steel and flows into the joints by capillary attraction. After brazing, the assemblies are cadmium-plated, and this is easily accomplished because of the clean surfaces of the parts.

The refrigerator parts made by the Eaton Detroit Metal Co. consist mostly of receiver tanks such as the one shown in Fig. 2. The tank shown is made of two stampings and two screw-machine parts, the stampings forming the shell and the screw-machine parts forming the connections at the ends. It is particularly desirable to have the refrigerator receivers free from oxides or flux which might otherwise work into the refrigerator mechanism and cause wear and noise; also the joints must be uniformly tight and the assemblies must have great strength. All of these requirements are fulfilled



STEEL gasoline-tank flanges for automobiles and tractors, copper brazed in G-E electric furnaces.

FURNACE BRAZING.....

with the electric-furnace-brazing process. The parts come from the furnace uniform in quality with respect to cleanliness, tightness and strength, as a result of the automatic control of the time in the heat, the furnace temperature, and the protective atmosphere. That the assemblies have good strength is demonstrated by the fact that they easily pass a 180-lb. pressure test in production.

Another product with good strength is the steel fanwheel assembly, shown in Fig. 3, made by the Chicago Pneumatic Tool Co., Cleveland. It has 25 copper-brazed joints and is made up of 14 stampings and one screw machine part. Originally the blades were only riveted to the supporting rings but they frequently worked loose at the high operating speeds required, necessitating considerable servicing of the product. The riveting is still being done but in addition the assembly is electric-furnace-brazed. This has resulted in greatly increased strength, complete elimination of service failures and consequent savings in service costs. All of the 25 joints are copper-brazed in one trip through the furnace, making the fanwheel a homogeneous body which, when struck, rings like a bell.

Assembling and preparing for brazing consists of spot welding the hub to the disc, pressing the vanes into slots in the disc, assembling a slotted ring over the vanes, and then riveting the vanes into the disc and the ring. Brazing metal is supplied by copper plating the members before assembly and by placing a copper-wire ring around the hub. The assemblies, each weighing 3 oz. and measuring $3\frac{3}{4}$ in. in diameter, are loaded on wire-mesh trays and charged into the box-type brazing furnace shown in Fig. 4. Each tray holds

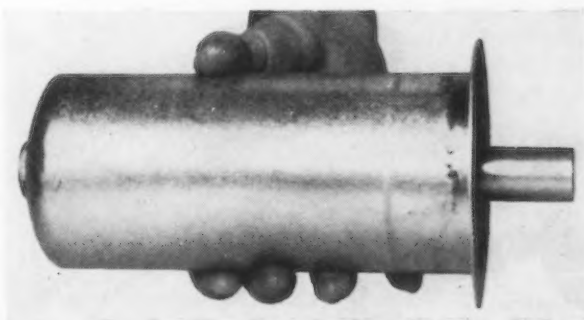
21 assemblies, and five trayloads or 105 assemblies can be brazed per hour by a single operator. When the fanwheels come from the furnace they need no subsequent cleaning and are, therefore, ready for general assembly in the products.

The furnace shown in Fig. 4 accommodates a tray 11 in. wide by 26 in. long. One tray rests on a cast-grid hearth plate in the heating chamber and three trays lie on the bottom plate of the liner in the water-jacketed cooling chamber. The electrical rating is 29 kw. and the output rating is 125 lb. gross per hour.

Certain companies do not find it advisable to invest in furnace-brazing equipment for their own plants but send their work to jobbers, such as the Queen City Steel Treating Co., Cincinnati, a commercial heat-treating plant equipped to do electric-furnace-brazing. The steel crankshaft shown in Fig. 5 is one of several refrigerator parts which

that company has been brazing in production for several months. The mesh-belt conveyor-type furnace in which these cranks are brazed is shown in Fig. 6.

The crank, Fig. 5, is made of a steel forging and a hollow steel shaft, there being a copper washer inserted within the joint to supply the brazing metal at the point indicated by the arrow. The cranks, weighing $1\frac{1}{4}$ lb. each, are in the heating chamber 16 min. The total time required to pass through the furnace is 80 min. The assemblies have strong, ductile joints capable of withstanding the vibration and



STEEL receiver tank for electric refrigerator—one of several models copper-brazed by the Eaton Detroit Metal Co.



o o o

AT LEFT

FAN-WHEEL assembly with twenty-five copper-brazed joints, made of 14 stampings and a screw-machine part.

o o o

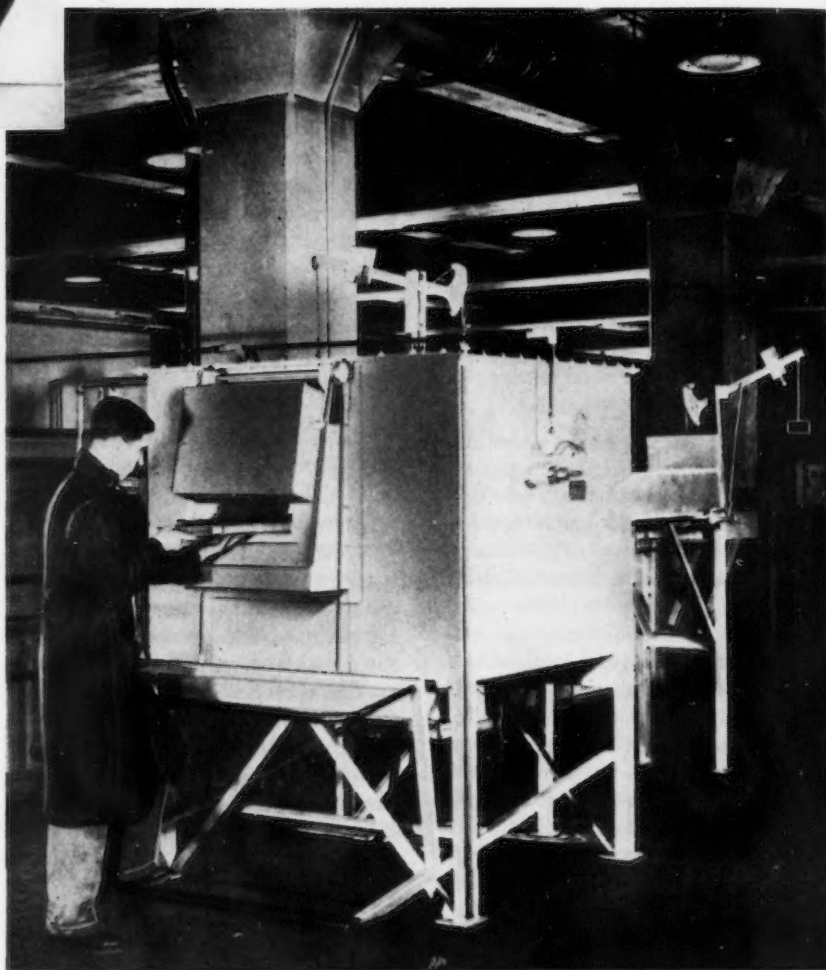
are now being fabricated at a fraction of their former cost.

An illustration of the great strength developed in the copper-brazed joints in the lock bolts is provided by the fact that they have been gripped at their extremities and twisted through 180 deg. without fracturing the brazed joints.

The brazing furnace at the Queen City Steel Treating Co. has a heat-resisting alloy wire mesh-

fatigue to which a refrigerator crank is subjected.

All of the afore-mentioned assemblies have been made of steel and brazed with copper. Other combinations of body metals and brazing metals can be used in the electric-furnace-brazing process. An example of the latter applications is provided by the Monel-metal lock bolts, shown in Fig. 7, which are used in laundry machines to resist corrosion. Formerly these parts were machined from solid stock but, because of their odd shape, the loss of material and the machining operation itself were appreciable items. Now the assemblies are fabricated from pieces of standard bar stock, and but a relatively small amount of machining is required. The shaft, which is turned down at one end, is pressed into a hole in the bolt head and a copper wire ring is placed over the shaft adjacent to the joint. Thus the assembly and preparation are relatively simple operations and as a result the lock bolts



BOX-TYPE brazing furnace, being charged with a tray-load of prepared fan-wheel assemblies.



STEEL crank-shaft for electric refrigerator copper-brazed by the Queen City Steel Treating Co. in Cincinnati.

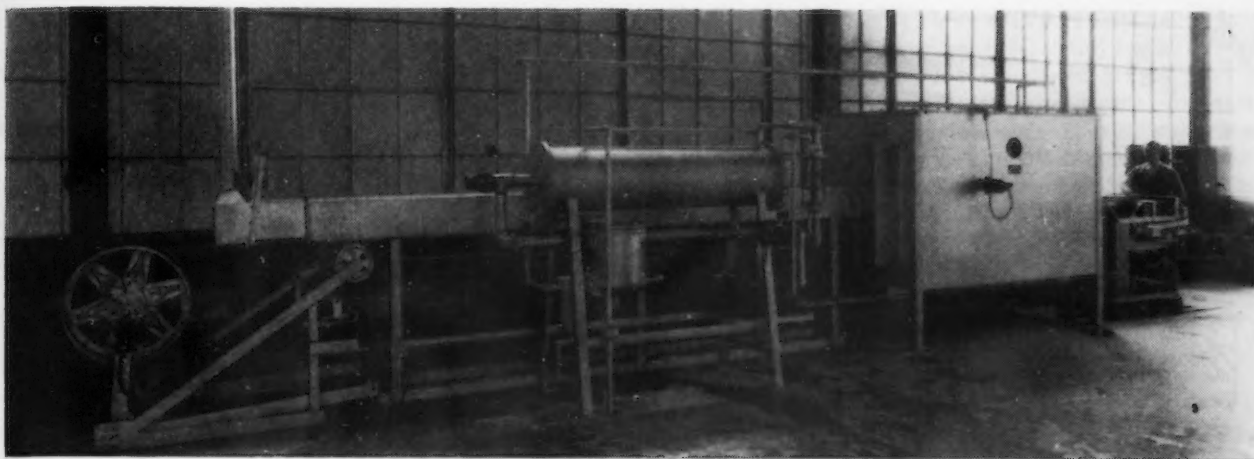
belt, the speed of which is adjustable for various types of work. The electrical rating of the furnace is 45 kw. and its output rating is 250 lb. gross per hr. including the belt. It is capable of brazing up to about 170 lb. net per hr. at 2100 F. The belt is 12 in. wide, the heating chamber is 5 ft. long and the cooling chamber is 15 ft. long. Heat is supplied by means of ribbon resistors mounted in removable frames in the roof and floor of the furnace. The protective gas is

supplied by a combustion-type furnace atmosphere controller.

New Uses of Electric-Furnace-Brazing in General Electric Factories

In addition to the copper-brazed steel subassemblies which have been used for the past nine years in the G-E refrigerators, several new uses of electric-furnace-brazing have been instituted in the manufacture of other General Electric products. Among these are: (1) bushing supports for oil circuit breakers, (2) Monel-metal cooling pads, and (3) finned-type Calrod heating units.

o o o
 AT RIGHT
MONEL - METAL
 lock bolts for
 laundry machines
 copper - brazed in
 electric furnace.
 o o o



G.E. Mesh-belt conveyor-type brazing furnace at Queen City Steel Treating Co. used for copper-brazing refrigerator parts and other sub-assemblies.

The bushing support now used in G-E oil circuit breakers is shown in Fig. 8. This is another departure from the usual steel and copper combination, since the tube is made of brass and the flange is made of either brass or steel as the conditions require. In this case the brazing metal is silver solder, and a flux is used to assist in its flow.

Formerly this subassembly was made of bronze tubing which was arc-welded with bronze welding rods to either a steel or a bronze flange. Although done by skilled operators, the job never had a very neat appearance and subsequent machining operations were always necessary because the flange was generally warped and the tube was frequently burned through during the welding. Now, since electric-furnace-brazing has been adopted, a neat fillet is always obtained, no

subsequent machining is required, and the same number of operators can braze several times the quantity formerly welded.

As an example of the relatively



BUSHING support for G-E oil-circuit breakers, made of brass tubing with either a steel or brass flange. Silver solder is employed for the brazing metal.

high production rate, the bushing support illustrated, which has a 2-in. diameter brass tube and a brass flange, is furnace-brazed at a rate of 72 per hr. The former hand-welding operation required several minutes for each assembly. The human element is now largely eliminated because the automatic temperature control of the furnace assures that the assemblies all have uniformly high quality.

In preparing the assemblies for brazing, wire rings of silver solder are placed over the tube near the joint and flux is applied in paste form on the wire and on the brass tubes. After this furnace-brazing operation, the parts are given a wash and bright dip.

More than 10,000 of these bushing supports have been electric-furnace-brazed up to the present date. It is conservatively estimated

(CONCLUDED ON PAGE 50)

COKE SAVED, HAZARD

BLOWPIPE FOR

A SAFETY blowpipe for blast furnaces that is designed to eliminate a long-standing hazard of blast furnace operation and is also claimed to result in a marked increase in the efficiency of the furnace by a saving in the coke consumption and of

The thickness of the insulation generally is not less than 1 in. and preferably more. The inner tube or sleeve is a centrifugally cast heat resisting member of a nickel-chrome alloy with a content of 35 per cent nickel and 15 per cent chromium, which is designated as

Misco metal by the Michigan Steel Casting Co., manufacturer of the alloy tubes. The end castings are made from the same alloy.

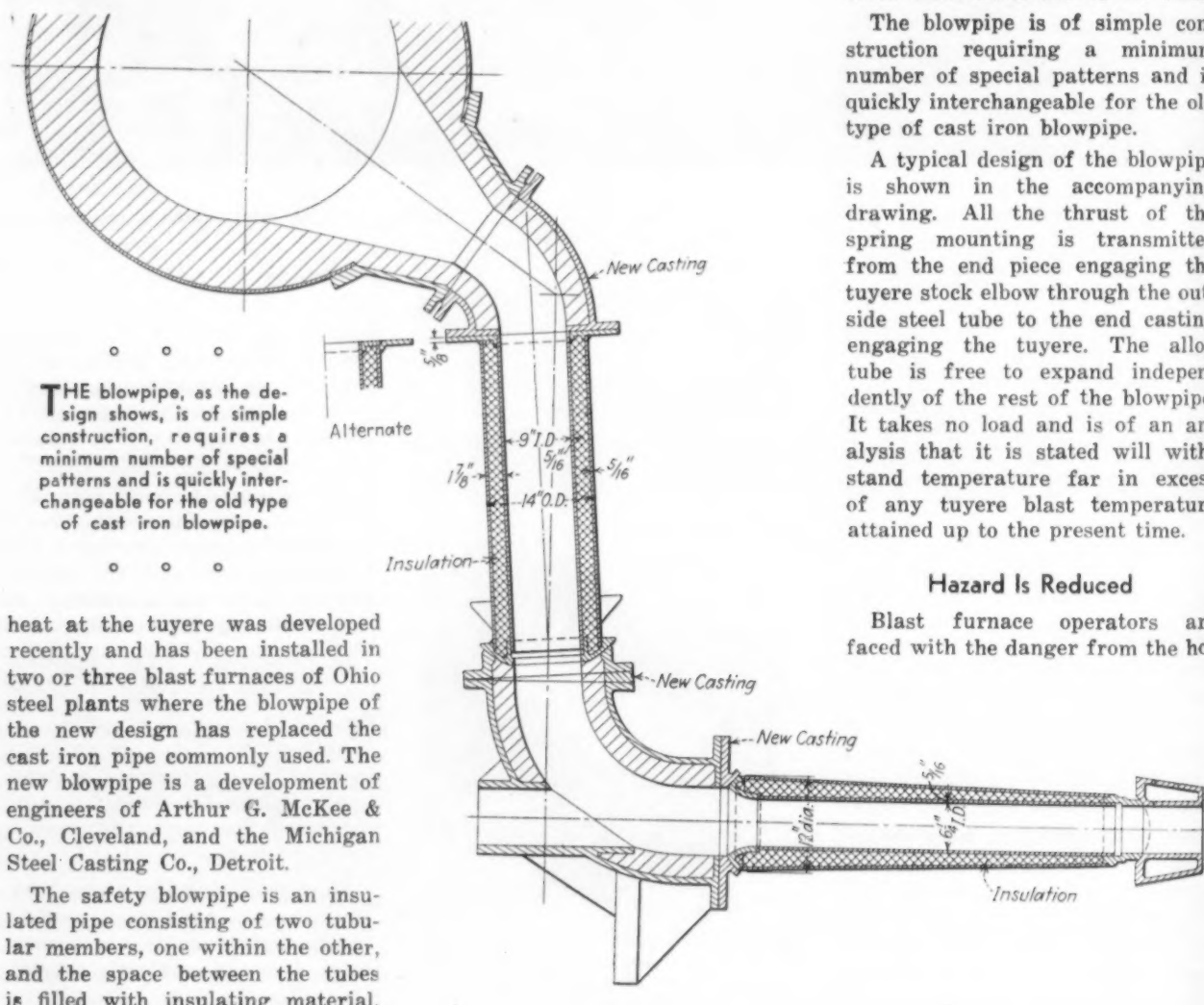
The inner sleeve acts as a retainer for the insulation, which fills the space between it and the outer tube. The latter is a welded steel tubing of plain open-hearth steel. Both tubes are $\frac{1}{4}$ in. thick.

The blowpipe is of simple construction requiring a minimum number of special patterns and is quickly interchangeable for the old type of cast iron blowpipe.

A typical design of the blowpipe is shown in the accompanying drawing. All the thrust of the spring mounting is transmitted from the end piece engaging the tuyere stock elbow through the outside steel tube to the end casting engaging the tuyere. The alloy tube is free to expand independently of the rest of the blowpipe. It takes no load and is of an analysis that it is stated will withstand temperature far in excess of any tuyere blast temperature attained up to the present time.

Hazard Is Reduced

Blast furnace operators are faced with the danger from the hot



REDUCED BY SAFETY

BLAST FURNACES...

blast which results when there is a failure of the cast iron blowpipes commonly in use. When a crack occurs a workman in close proximity to the failure is in danger of being severely burned and the hazard extends to everyone in the plant in case of a complete break. The risk is particularly present in the case of a blow-back when it is the usual practice to play a hose on the bare iron pipes. In that event the iron pipe is subjected to a severe thermal shock and the lives of workmen nearby are endangered and some fatalities have resulted.

With the general trend toward

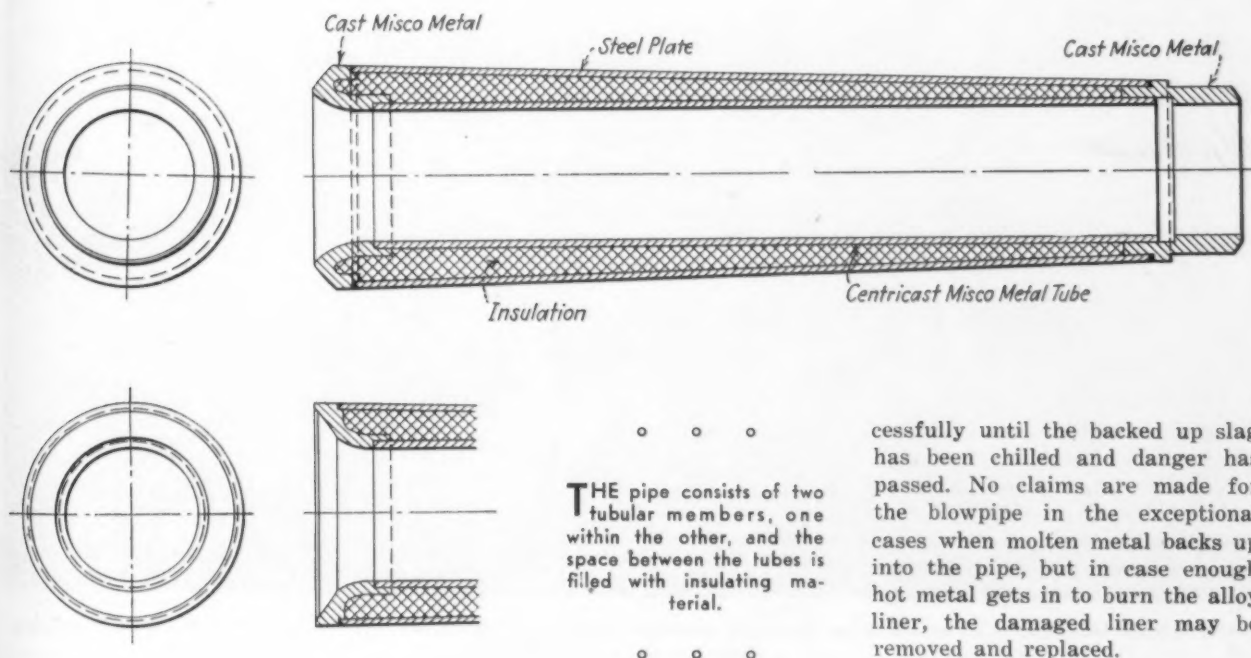
By F. L. PRENTISS

Cleveland Editor, The Iron Age

higher blast furnace temperature, this hazard has grown. With the use of thoroughly cleaned gas in stoves of greatly increased capacity and thermal efficiency blast temperatures in excess of 1500 deg. F. have become available and with improved raw materials and furnace construction in many cases have become highly desirable. Safe

methods for handling the blast therefore have become necessary in progressing to general use of high blast temperatures.

With the insulated blowpipe the outer tube, it is stated, is thoroughly protected from the temperature of the blast and the hazard existing from the use of bare pipes is eliminated. Although such occurrences are no longer frequent in modern blast furnace practice, blowpipes occasionally become filled with hot slag and the insulated pipes have proved efficient under such conditions, the alloy liner having heat-resisting properties to resist attack suc-



cessfully until the backed up slag has been chilled and danger has passed. No claims are made for the blowpipe in the exceptional cases when molten metal backs up into the pipe, but in case enough hot metal gets in to burn the alloy liner, the damaged liner may be removed and replaced.

Tests of experimental models of the insulated blowpipe reveal some interesting data indicating a substantial saving in heat loss and consequently in fuel costs when the insulated pipe is used. Comparative tests were made on a cast iron blowpipe and one of insulated construction, each having over-all length of 3 ft. 10¼ in. and a diameter of 9⅞ in. at the large end and 7½ in. at the tuyere end.

Measurements of the temperature were taken by inserting long thermocouples through the peep hole to a point 1 ft. from the tuyere end of each blowpipe, the bustle pipe temperature at the time averaging 1540 deg. The bare cast iron blowpipe had a temperature of 1305 deg. at the point mentioned and the insulated blowpipe a temperature of 1415 deg., a saving of 110 deg. in this short length. Reduced to temperature drop per

foot of length for general comparisons of blowpipes of this diameter, the temperature drop amounts to 43.4 deg. per ft. in the case of the bare pipe and only 5.2 deg. per ft. in the insulated pipe.

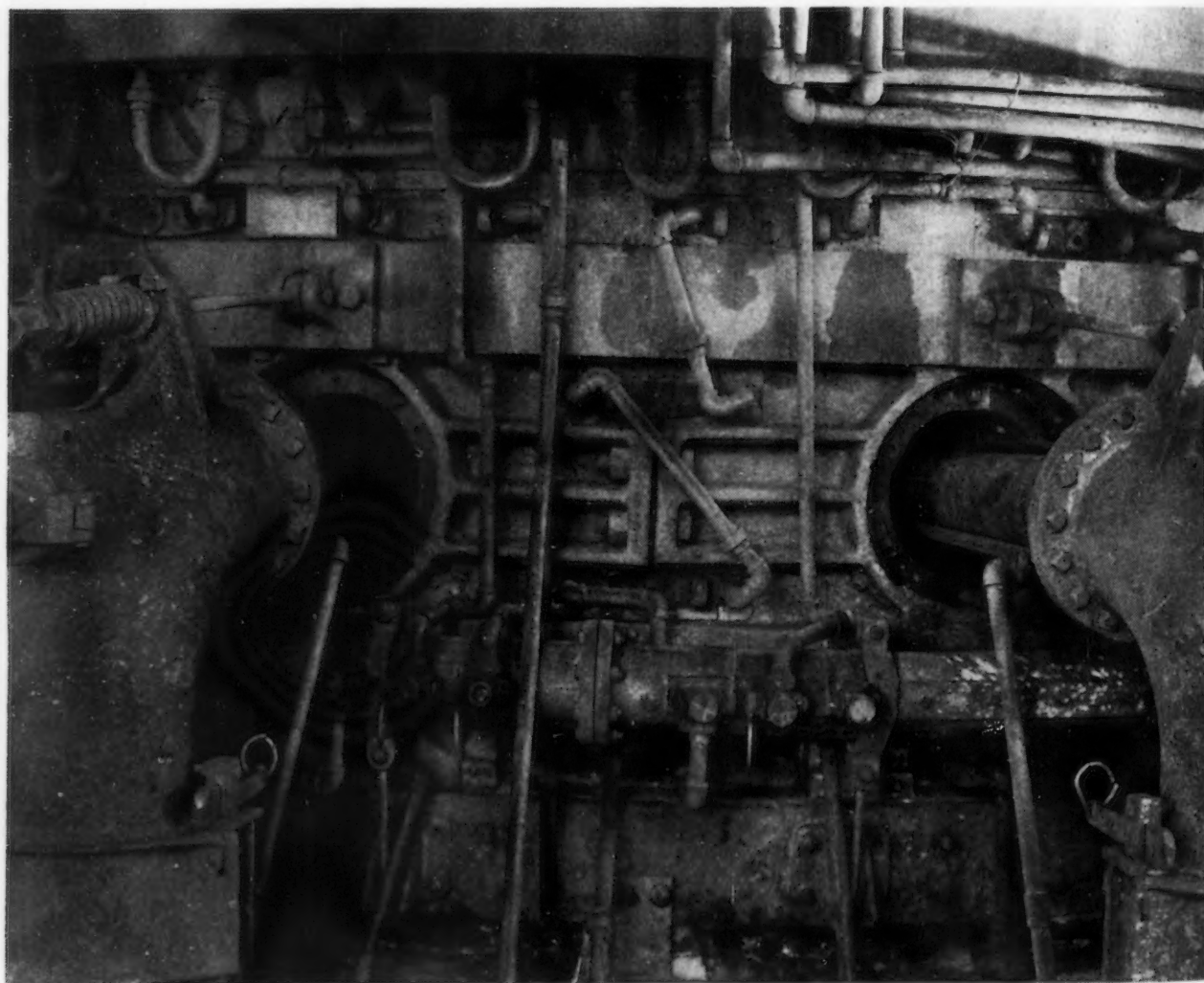
The implications of these tests were so surprising that it was deemed desirable to go into the subject of convection and radiant heat losses to check thoroughly against these results. Very little heat loss data is available above 1100 deg. for such computations. However, the trend of graphs available for lower temperatures, together with selection of constants within the probable range of variation, plus recognized correction for variations in outside moving air, are said to indicate that the above-mentioned results agree with what might be expected. The results can readily be checked in a general way by a furnace operator by sim-

ilar thermocouple readings through the peep hole.

Furnace Efficiency Increased

The importance of this temperature saving, it is pointed out, is far greater than it would be were it based only on the coke saving that results from the saving of the B.t.u. loss through the bare blowpipe. Should a blast furnace have a set of 14 insulated blowpipes of the dimensions given above and each have 9 sq. ft. of surface, the coke saving is placed at 8250 lb. for 24 hr. However, because of the higher temperature at the tuyere the over-all efficiency of the furnace is said to be increased from a coke consumption standpoint. In the opinion of many blast furnace operators, an additional temperature of 200 deg. at the tuyere is equivalent to a sav-

(Concluded on Page 94)



INSULATED blowpipe, which is said to be thoroughly protected from the temperature of the blast and the hazard existing from the use of bare pipes.

FOR SATISFACTORY HEAT TESTING

...OBSERVE THESE ADMONITIONS...

o o o

By A. S. EVES

*Vice-President, Perfection Tool &
Metal Heat Treating Co.*

o o o



A professional heat treater is often placed at a disadvantage by customers who are careless in their specifications and quite often unfair in their demands. Both the heat treater and customer want a worth-while job, and this objective is more easily reached if the following facts are fully recognized. Many of these observations are "old stuff," but in innumerable instances a complete recognition of this "old stuff" would ease the lot of the heat treater and be profitable to the customer.

Most men, though by no means all, understand that a cut of 1/32 in. to 1/16 in. must be taken off steel in order to remove the iron oxide coating which is rolled on at the mill. Surfaces not thus cleaned cannot be hardened. Mere polishing just deceives the hardener until the steel is treated, after which the soft surface and hard interior tell the story.

However, apparently few men have come to realize that if a piece exceeds 2 in. in any dimension an equal cut should be taken from all sides. If this is not done, the quench takes immediate effect upon the side that is cleaned, but the remainder cools more slowly, with the result that the piece is pulled out of shape. Straightening then becomes necessary. This may consume hours of valuable time, always with the possibility of fracture.

Instructions to the steel treater to "harden this straight" are clearly ridiculous, but only too frequent. To attain the desired hardness, heat must be applied and the piece must be cooled. If there are unseen factors that cause distortion,

subsequent precautions are of little avail.

It is a well-known fact that strains are sometimes set up in steel by "hogging" it. Careful machining takes more time, but saves warpage and consequent grief.

Again, it is unpleasant to think of how many forged dies and parts are spoiled each year and how many times such instances have brought calamity upon heat treaters who are actually innocent of any wrong-doing. It is altogether obvious that hammering steel causes changes in its structure. When it is heated to a high degree these will show up. But it is then too late to do anything about it unless the practice is adopted which more and more firms are profiting by as time goes on, namely, to rough-machine such pieces, then have them thoroughly normalized and annealed before they are finished up for hardening.

Name Steel Properly

Another common source of trouble is failure to inform the heat treater of the make and grade of steel he is given to treat. Still worse is it to give him information which is not correct. Frequently these mistakes are traceable to a need for properly marking bars before placing them in stock. There are literally hundreds of varieties of steel on the market which are extremely difficult to distinguish one from another. No commercial hardener can afford to "spark" every piece that comes in for treatment. At best, sparking on a

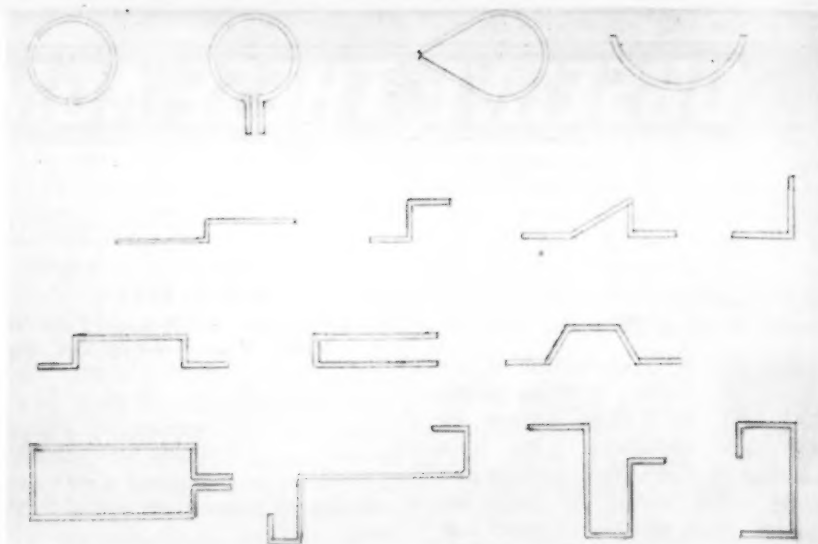
wheel is mere makeshift, and does not always tell the facts required. Nor is it enough merely to specify in a general sort of way the kind of steel, such as "high speed," or "tool steel," or even "oil-hardening tool steel." Some brands of oil-hardening tool steel, for example, will harden at around 1400 deg. F., while others need higher and higher temperatures, perhaps as high as 1800 deg. F.

To make a mistake in naming the make and grade of steel to be treated, that is, specifying a water-hardening steel when it is oil-hardening, or vice-versa, brings about one of two situations, both bad. Either the piece will break and be a dead loss, or after the process is completed it will be found to be too soft. If too soft, it must be rehardened, perhaps two or three times before the problem is finally solved through guesswork. The life of the steel has thus been taken out. The steel treater is put to double or treble his normal expense for time, fuel and labor. He may be reluctant to hand this extra cost along to his good customers. However, the Metal Treating Institute, now comprising most of the responsible commercial metal treaters, is constantly emphasizing that this additional cost is a fair and just charge and that some firms will not wake up until they have to pay it.

It is advisable that the hardener also be informed just what the piece given him is for, how it is to be used, or what it is to be used on. This affords him an opportunity to gain a mental picture of the purpose of the job. If it be a blanking die, for instance, for use on heavy stock, he will draw it

(CONTINUED ON PAGE 94)

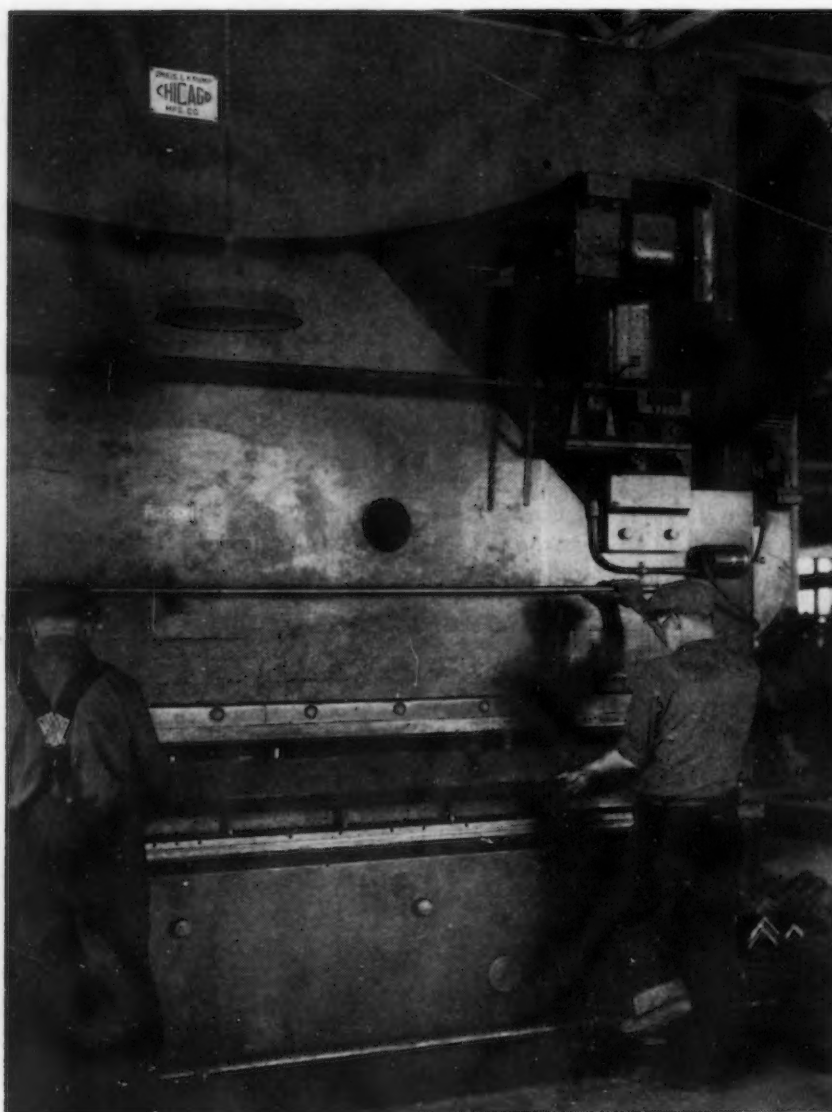
....FORMING SHAPES



BELOW

AN infinite variety of structural shapes can be formed from flat stock by a relatively few simple tools on the press brake.

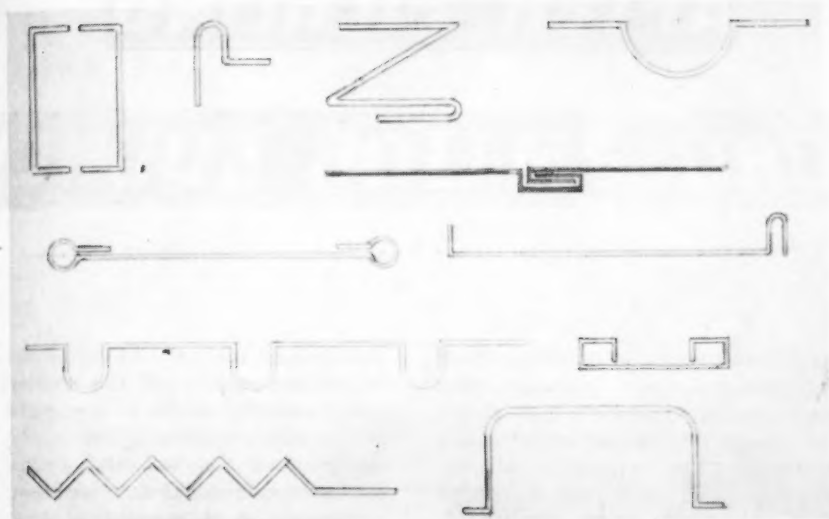
AVARIETY of shapes flat stock on a as structural members of "aways" for the



MECHANICAL Handling Systems, Inc., Detroit, finds its 14-ft. press brake the most useful tool in the shop. The company makes multiple unit "haul-away" trailer trucks for the shipment of automobiles and overhead monorail and other types of industrial conveyors so popular in the automotive industry. They are fabricated from what would generally be termed structural shapes. Yet the usual rolled shapes do not lend themselves to the wide variety of sections called for, particularly in the trailer units.

Another problem arises from the fact that none of these units runs into volume production and each trailer must literally be designed around the cars it is to transport. Each design is individualized. Every time models are changed, the trailers have to be redesigned and rebuilt. But with the type of riveted and welded construction employed, it is rather simple and inexpensive to make the conversions. At the same time, it would be a regular warehousing job to stock all the sizes and varieties ordinarily required, even in the small volume encountered, if rolled structural shapes were employed exclusively.

FROM FLAT STEEL....



bent and formed from press brake. They serve custom-built "haul-automotive industry.

The company has found it practical to stock a few sizes of channels, angles and I-beams and let the rest of its steel requirements come in in the form of sheets and plates. This flat-rolled steel can be cut on the shear and bent into an endless variety of useful shapes in the press brake. With the aid of a few standard forming tools and some special ones, a surprisingly large number of such shapes can be produced without necessitating excessive tool inventories and expense. These shapes serve as corner posts, cross-brace members and wheel housings. In those vehicles with closed compartments, this method of fabrication lends itself well to door posts and to overlapping side panels. Floor material can be made of sheet stock by corrugating at any desired pitch. This saves welding on stiffener angles. An assortment of such shapes are illustrated in cross-section.

Such shapes do not supplant the standard structural shapes—they supplement them and are often used in conjunction with them on the same carrier frame.

A 14-ft. press brake takes care of almost any size encountered, and at the same time is flexible enough to handle smaller sections by applying less-than-full-length conjunction tools at one end.

o o o

BELOW

Z-SECTIONS and channels bent from the sheet go to make up this trailer frame. The formed wheel housing serves both as a mud guard and structural load-carrying member.





CORROSION-----

AFTER PICKLING

MAJOR SOURCE

THIS last article of a three-article series deals with the reducing action of molten zinc in galvanizing baths upon roll scale. In many cases work goes into the bath that has not been completely pickled. It is shown that there is a very marked resistance of roll scale to the action of molten zinc at ordinary galvanizing bath temperatures. The purpose of this Research No. 3 was to determine whether roll scale is one of the sources of iron to form galvanizer's dross, and, if it is, just how readily the iron in the scale may be freed from this form of iron oxide.

Ordinary roll scale is largely magnetic oxide of iron, with large amounts of free iron rolled into it, and in many cases it contains some siliceous material picked up from the furnace bottom during the heating of the raw material forming the product that is to be galvanized.

The results of Research No. 1, "The Reducing Action of Molten Zinc at Galvanizing Bath Temperatures Upon Sulfur, or Water Rust, Green Ferrous Sulphates and Chlorides, and Soft Light Yellow to Brown Iron Oxides" (see THE IRON AGE, Dec. 5, 1935), showed conclusively that the available iron in these chemical compounds is easily reduced from the iron oxides and alloyed with zinc to form ordinary galvanizer's dross; it also showed that the dross, or zinc-iron alloy, is formed easily.

The results of Research No. 2, "The Reducing Action of Molten Zinc at Galvanizing Bath Temperatures Upon Magnetic Oxide of Iron" (see THE IRON AGE, Feb. 20, 1936), showed conclusively that the available iron in this chemical compound is also reduced by the molten zinc from the iron oxide and goes to form the common zinc-iron alloy galvanizer's dross. Also brought out was the fact that it was more difficult to reduce the iron from this iron oxide, and, as a consequence, the practical aspect was that the bath temperature had to be raised in order to accelerate the action and obtain a perfect zinc coating.

• • •



ALL the research investigations in this experiment were carried out under identically the same conditions as described in the two previous articles of the series. As with the previous tests, the zinc and roll scale were heated together at 800, 850, 900, 950, 1000, 1100, 1300, and 1565 deg. F. The time of heating was 6 hr.; the gas was then cut off and the melt allowed to cool in the furnace over night. In the morning the melt was removed from the crucible, and cut in half, one half be-

ing used for chemical analyses, and the other for examination under the microscope. In all cases there was no possible source of iron available other than the iron found in the roll scale heated in each melt. The results herewith submitted show the action at each temperature, and also show how much iron was reduced by the zinc.

It is interesting for a moment to compare the melts of all three of these series, and briefly call attention to what has happened. By closely examining each set of melts it will be seen that the de-

struction of the melt, or the severity of the action of the molten zinc gradually shifts to the right as the series progress; that is, the action upon the red and yellow oxides of iron starts at a low temperature and is more violent at higher temperatures. The severity shifts a little to the right with the magnetic oxide of iron series, and the temperature must be still higher to produce the same destruction. In the scale series, there is very much less action, and the degree of destruction has shifted considerably to the right or to a very much higher temperature. These facts are seen by the size of the pile of oxidation product in front of the melt, and also by the whiteness of the melt which indicates the formation of zinc oxide. In Research No. 2 the white oxide can be plainly seen at 1100 deg. F.; it moves to the right and appears at 1300 deg. F. for the research described herein, an increase of 200 deg. F. in temperature. In the scale series it will be noted that all but the last two melts are dark in color; the others show very little indication of oxide formation. This indicates that roll scale resists the action of the molten zinc to a far greater degree than the products examined in Researches Nos. 1 and 2.

It is now of practical interest to discuss what has happened to the individual melts at the different temperatures.

The very first feature that is seen in Fig. 2 (upper view) is the very large crystals of zinc that take up the entire field. Attention is called to the rhombic outlines in the center of the large dark zinc crystal. These are zinc-iron alloy. A close study of the formation of

By WALLACE G. IMHOFF

Consultant for Zinc Coating,
Vineland, N. J.

OF GALVANIZER'S DROSS

ordinary dross crystals has shown the interesting fact that dross crystals form from the outside in; the forces of crystallization form the outline of the crystal first, and fill it in later. Dross crystals at low temperatures, that is under 900 deg. F., crystallize in the form of rhombohedrons, in the hexagonal system.

The second point of interest in this melt is that so far as can be seen there seems to be absolutely no evidence of the presence of dross. A third feature is that the zinc-iron alloy appears to have spread uniformly throughout the zinc crystal. Fourth, the rhombic outlines as shown by the light areas indicate that the forces of crystallization are present, but that there is not enough iron present to form whole crystals of dross. It might be noted at this point that zinc-iron alloy is merely the early stage of dross; when there is more iron present than the bath can hold in solution as zinc-iron alloy, then it crystallizes out and in this form it is called dross crystals, and the two, the dross crystals with the bath around them, are called ordinary galvanizer's dross. Fifth, there is a porous area of undigested scale at the top of the melt.

Melt at 850 deg. F.

The following interesting facts were to be seen in the melt at 850 deg. F. as shown in Fig. 2.

(1) The most striking feature is the large pieces of undigested roll scale that can be plainly seen in the photomicrograph. These are shown by the very black areas. The thin line across the middle of the plate is a piece of roll scale turned edgewise to the view. The large round area is a piece of scale lying almost parallel with the way the melt was cut for polishing.

(2) This illustration shows the development of zinc-iron alloy from the scale.

(3) The large zinc crystals are not clear, but ragged looking. This is caused by the formation of the zinc-iron alloy.

(4) The increase in the amount of zinc-iron alloy in the dross crystals.

(5) The large area of undigested scale at the top of the melt which still exists at the higher temperature.

(6) The development of extremely minute dross crystals at the bottom of the melt.

The roll scale is much more resistant to the reducing action of

the molten zinc than is the sull or water rust, or the magnetic oxide of iron at this same temperature. A possible explanation is that roll scale is formed under conditions of great heat and pressure, and it therefore requires much more energy to break it down, and free the iron in it.

Melt at 900 Deg. F.

Some very practical and some very interesting facts are found in the melt illustrated in Fig. 2 when zinc and ordinary roll scale were heated together at 900 deg. F. It will be noted here for the first time that dross crystals become distinct. They are very small, but it brings out the fact clearly that at a temperature of 900 deg. F. dross crystals form. The significant fact, therefore, for the practical galvanizer is that no part of the galvanizing bath at any time, or for any reason, should be above 900 deg. F. Many practical tests have shown that the safe working range is 875 deg. F. for the bottom of the bath down in the dross. This is the first feature strikingly shown by this melt at 900 deg. F.

(2) Zinc crystals are becoming indistinct. It can be seen that as the temperature rises the forces

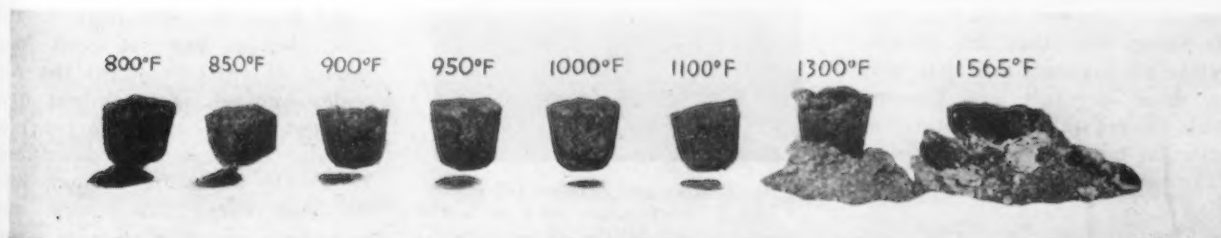


FIG. 1—Results obtained when molten zinc and roll scale are heated together for 6 hr. and cooled slowly. As indicated, the tests were made at various temperatures throughout the galvanizing range, up to a final temperature of 1565 deg. F. Note how roll scale resists the action of molten zinc up to a temperature of 1300 deg. F.

of destruction become more powerful and the reducing action of the molten zinc becomes stronger.

(3) There are still large fragments of undigested scale at the top of the melt. The dross crystals are heavier than the zinc, hence they sink to the bottom of the melt as fast as they are formed.

(4) This accounts for the large zinc crystals still found at the top of the melt.

While it is distinctly shown that the dross crystals do form at 900 deg. F., another feature of interest is found in this series of tests with roll scale. It is the much stronger resistance to the reducing action of molten zinc that roll scale shows.

Melt at 950 Deg. F.

The greater resistance to be broken down by roll scale is shown by the melt at 950 deg. F., illustrated in Fig. 2. This photomicrograph shows the condition of the melt at the top. The features of importance are as follow:

(1) There are still very large crystals of zinc. This illustrates another practical fact, namely, that as fast as dross crystals form they settle to the bottom of the bath and the bath at the top remains more or less clear. Such performance is well known to practical galvanizers.

(2) The outlines of the zinc crystals are indistinct.

(3) Close observation shows the outlines of very fine needle-like dross crystals throughout the zinc crystals.

(4) There is still much undigested scale at the top of the melt.

Melt at 1000 Deg. F.

The appearance of the top of the melt when roll scale and zinc have been heated to a temperature of 1000 deg. F. and allowed to cool in the furnace over night is shown in Fig. 3. This figure shows two very large zinc crystals. However, a very close observation of these zinc crystals shows that they are disintegrating throughout, and that very fine dross crystals are forming within the crystals. The features of particular interest that were found in the melt at 1000 deg. F. are as follow:

(1) The extreme size of the zinc crystals. Attention is called here that this feature follows the general rule of crystallization that the

higher the temperature, the slower the cooling, and the less disturbance during cooling, the larger the crystals will be that are formed.

(2) There are still large undigested areas of roll scale at the

top of the melt even at this high temperature. This would perhaps call attention to still another important factor of destruction, namely, the time element. There is no doubt that all the roll scale would entirely be digested and turned to dross if given a long enough time for the reducing action to go on.

(3) There are a mass of medium-sized dross crystals to be seen at the bottom of the melt.

The view to the right in Fig. 3 shows these medium-sized dross crystals clearly. Here for the first time the formation of dross from roll scale is plainly shown. Attention was called to the fact that dross starts to form at a bath temperature of 875 deg. F., and it was pointed out that from a practical standpoint this should be the danger point, or upper limit of bath temperatures down in the bottom of the pot. It should not be taken for granted because at the bottom of the bath it cannot be seen that dross is not forming. This plate at 1000 deg. shows that when the bath at the bottom is at that temperature, dross is forming rapidly.

The following features of interest are to be seen in the view to the right in Fig. 3:

(1) Actual dross crystals are clearly visible.

(2) The very large number of dross crystals.

(3) The absence of a large amount of zinc-iron alloy in the area of the dross crystals. This fact indicates that the segregation of the iron from the zinc-iron alloy tends to clear up the zinc and make it purer.

Melt at 1100 Deg. F.

It is now interesting to examine the condition of the top of the melt. Fig. 4 shows the condition of the melt at the top when roll scale and zinc have been heated together at a temperature of 1100 deg. F. The points of particular interest to be noted in this melt are as follow:

(1) Even at 1100 deg. F. the time element has not been long enough to entirely digest the roll scale. Another factor might also be mentioned as having a bearing, namely, the closeness of contact. The scale was stirred down into the melt every two hours, and there is no doubt that scale actually down in the melt would be attacked to a far greater degree than roll scale still at the top of

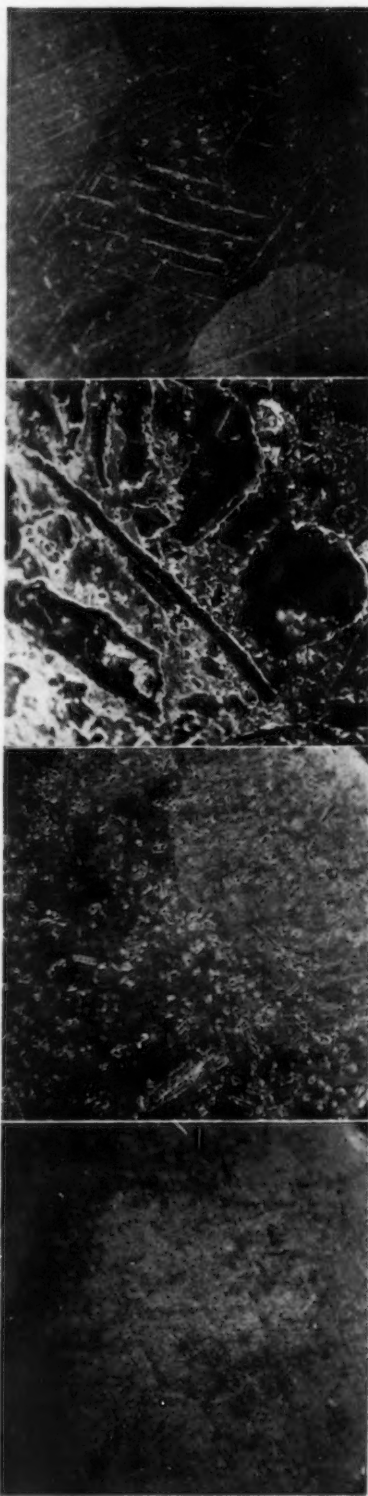


FIG. 2—Zinc and ordinary roll scale held at temperature for 6 hr. and slowly cooled in the furnace over night. Reading from top to bottom: temperature of 800 deg. F., 850 deg., 900 deg., and 950 deg. F. All photos at 36 diameters.

the melt. This point is well illustrated in Fig. 4, which shows some of this roll scale at the top of the melt still undigested.

(2) It also illustrates clearly that 1100 deg. F. is a transition point.

(3) The entire specimen is made

have been made to show the points of importance mentioned.

The middle photo in Fig. 4 is another view from the top of the melt at 1100 deg. F. The features clearly illustrated here are as follow:

(1) The very large piece of scale lying crosswise of the field.

is another view of the melt at 1100 deg. F., and this illustration has been selected because it shows so well the granular zinc-iron alloy which has been mentioned from time to time. The particular feature of interest there is the frosted or white area in the center of this

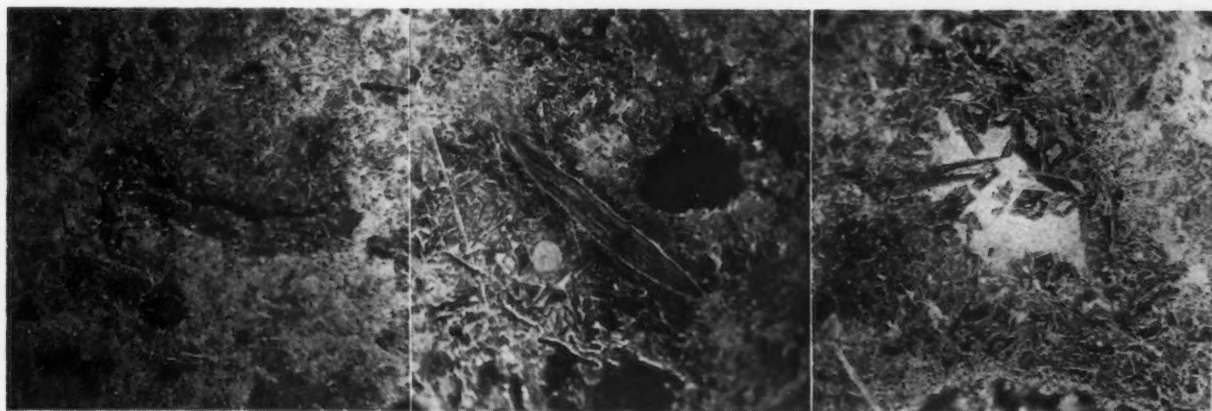
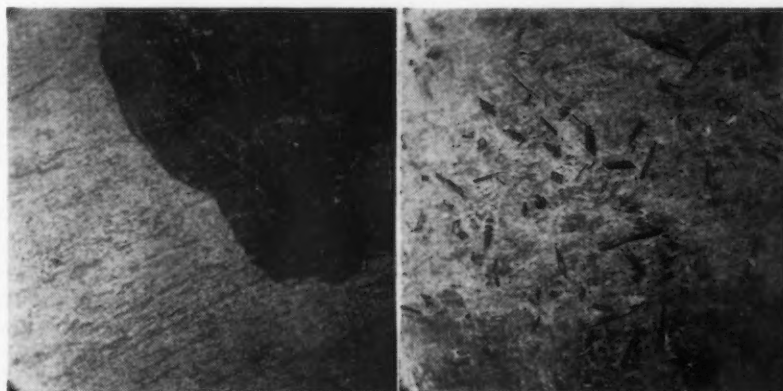
AT RIGHT

FIG. 3—Zinc and ordinary roll scale heated to 1000 deg. F. for 6 hr. and slowly cooled in the furnace over night. Photo at left is from top of melt, and on the right is the appearance at the bottom of the melt. Both views at 36 diameters.

o o o

BELOW

FIG. 4—Zinc and ordinary roll scale heated to 1100 deg. F. for 6 hr. and slowly cooled in the furnace over night. The view on the left is from the top of the melt, in the middle is a clearer view of undigested scale at

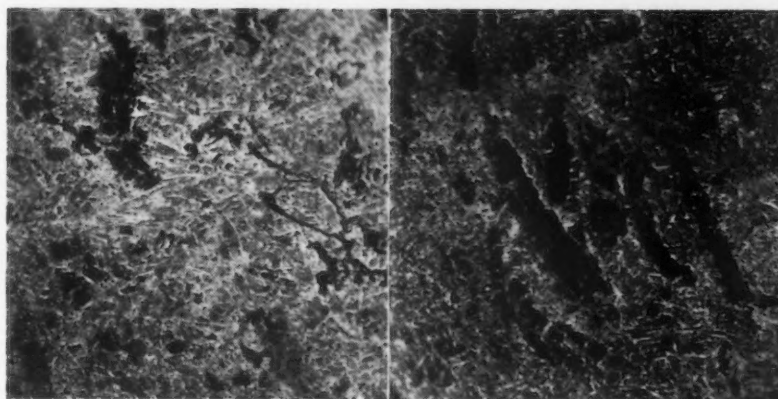


the top of the melt, and the photo on the right shows a typical formation of granular zinc-iron alloy.

o o o

AT RIGHT

FIG. 5—Zinc and roll scale heated to 1300 deg. F. for 6 hr. and slowly cooled in the furnace over night. Undigested particles of roll scale are shown by the black areas in the view on the left; broken dross crystals and green oxide of zinc are also present. The photo on the right shows black areas of undigested scale and the entire field is covered with broken dross crystals.



up of broken and crushed dross crystals, zinc-iron alloy, and green oxide of zinc at the top of the melt.

(4) There are well-developed areas of granular zinc-iron alloy.

(5) Undigested roll scale particles are still found in the melt.

This temperature is so important that a number of illustrations

(2) This large piece of undigested scale shows that the time element has not been sufficient for it to be completely digested.

(3) Attention is called to the many broken dross crystals and the zinc-iron alloy around this large piece of scale.

The photo to the right in Fig. 4

photomicrograph, which is the zinc-iron alloy. Its granular appearance can be recognized.

(2) The second point of interest is the large dross crystals that surround the granular zinc-iron alloy in the center.

(3) At 1100 deg. F., the green
(CONTINUED ON PAGE 95)

....STREAMLINE YOUR

By **RAYMOND L. COLLIER**
Secretary, *Steel Founders' Society*
of America

o o o



PICTURE yourself as having been assigned the task of designing a cast steel structure or component. It is assumed that for the application in question, cast steel has been selected because of one or more of the mechanical advantages or properties it has to offer; widest range of physical properties of any cast metal;

a specific part or structure so that a pattern can be built and castings produced therefrom. The experienced designer will probably first make a rough sketch of what he has in mind and then call in an engineer from the steel foundry that will be called upon to produce the castings. The latter will usually be able to offer helpful suggestions as to proportioning the piece; where sharp angles should be avoided; where sectional thicknesses should be equalized as much as possible; where slightly tapering members should be used and where metal thickness can be cut down without compromising use-

MOST mechanical engineers are called upon at one time or another to design steel castings for use as integral structures or in composite assemblies.

In the accompanying article the author outlines some practical considerations relating to steel casting design which may assist those who are only occasionally faced with such problems and have not, from experience, discovered these principles for themselves.

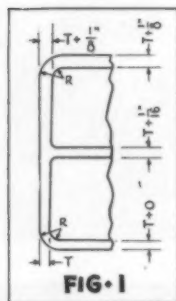


FIG. 1

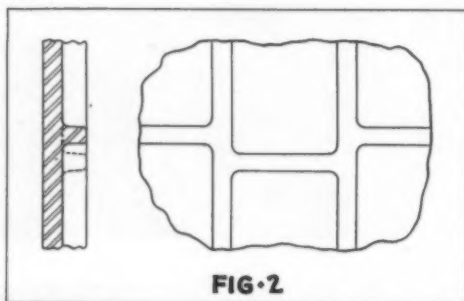


FIG. 2

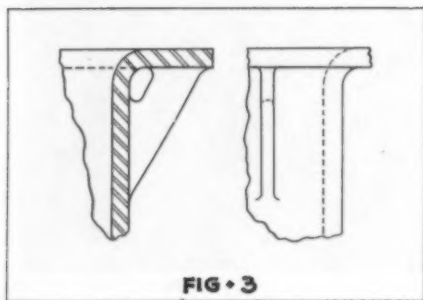


FIG. 3

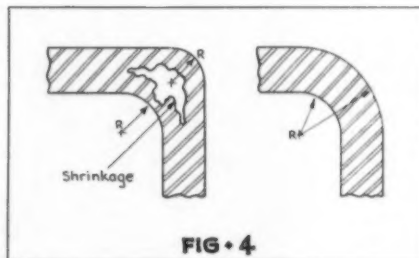


FIG. 4

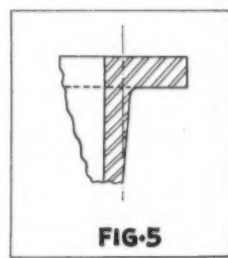


FIG. 5

toughest cast material—ability to take brutal punishment; high impact strength; resistance to abrasion, corrosion, high temperatures, high pressures, heavy static loads or dynamic stresses, etc.

The problem before us is simply one of producing a drawing of

ful strength and, perhaps, even improving it.

The question of tapering certain members is a most important one. One foundry might cast the pattern in a horizontal position; another might cast it vertically. Taper must be provided so that the pattern can be removed from the sand without injuring the mold impression formed by it. Without consulting the foundry that will make the castings, the taper or draft might be carried

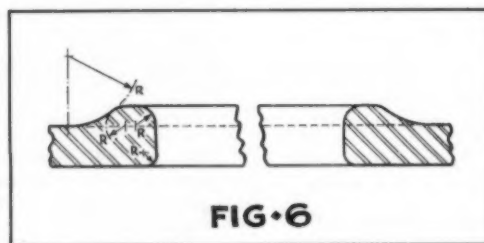


FIG. 6

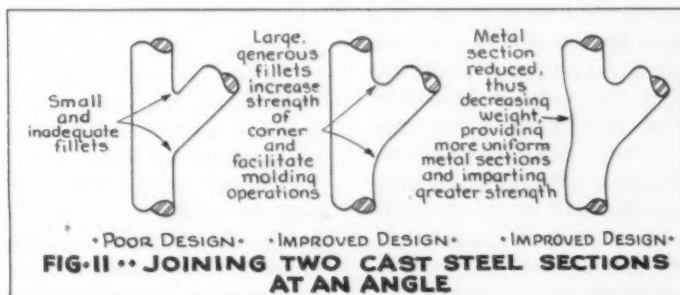
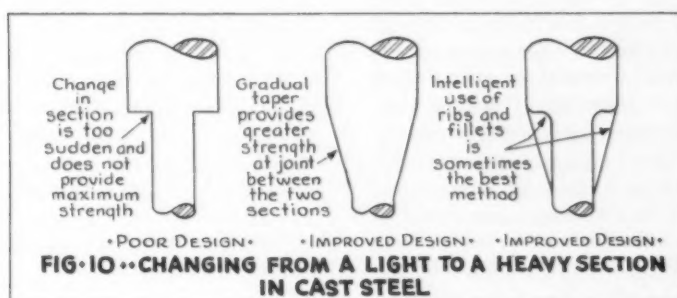
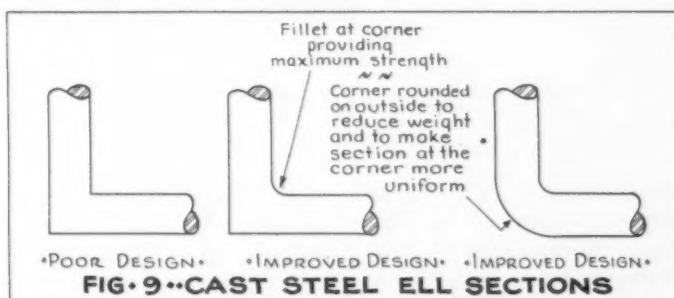
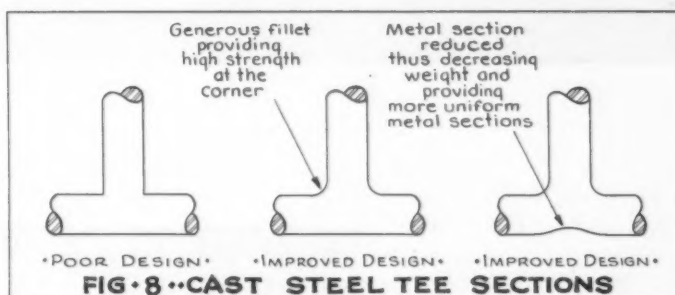
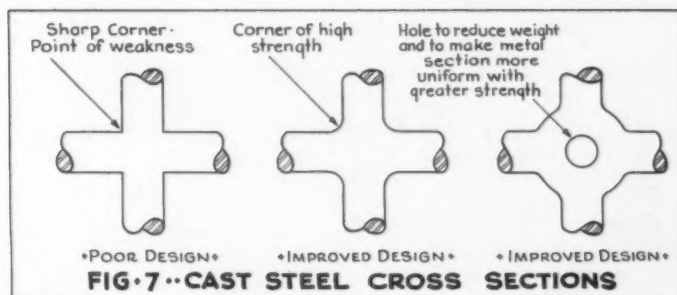
STEEL CASTINGS....

out in such a way as to make the production of good sound castings an extremely difficult procedure, if not impossible. Figure No. 1 illustrates the principle of slightly tapered sections. If cast in the upright position shown in the diagram, the slightly heavier section, at the top, helps to "feed down" the molten steel so as to secure maximum density. The cross section being slightly larger and the volume of molten steel correspondingly greater at the top than at the bottom, the heat of the "feed" metal is not dissipated as readily, which means that solidification progresses from bottom to top and liquid steel above feeds down by gravity to occupy any space which otherwise would be left by the contraction of the solidifying metal. It is very important, therefore, to know in what position the foundry will pour the castings. After that the proportioning of wall-thicknesses from top to bottom will be relatively safe and easy.

There is another question involved in determining taper, which should be determined by the manner in which the molds will be made. In general, molds consist of two sections (cope: top; and drag: bottom), part of the cavity to be filled with molten metal being formed in each section. The dividing line between that part of the pattern to be formed in the cope and that to be formed in the drag is called the "parting line." Draft or taper is generally figured from this parting line as a base point, the casting members being tapered down as they extend upward or downward from the parting line. Unless the designer knows where this line will be located by the foundryman, he is not in a position to specify correct taper for the various parts or members of the casting.

In general, a steel casting with wall-thicknesses which are prac-

(CONCLUDED ON PAGE 104)





FRONT view showing the porch with the glass-block wall of the library directly behind. The door on the left opens into the garage with that on the right leading into the living room.

ULTRA-MODERN HOUSE

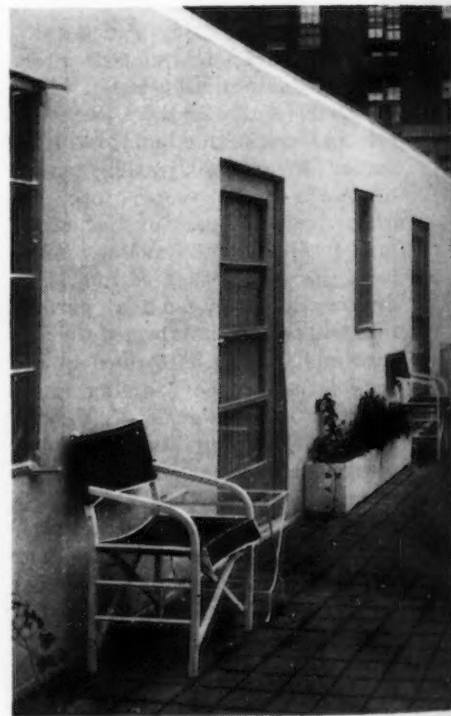
A TWO-STORY, all-steel house, constructed by National Houses, Inc., 60 East Forty-second Street, New York, at Park Avenue and Thirty-ninth Street, New York, enables New Yorkers to see for themselves just what steel has to offer for the modern home. Completely surrounded and almost dwarfed by nearby skyscrapers, the visitor's first impression is one of disappointment at the apparent smallness of the structure, but this feeling soon turns to one of pleasant surprise as the spaciousness of the rooms and the convenient planning of the dwelling is observed.

Furnished throughout by the Modernage Furniture Co., 162 East Thirty-third Street, New York, the interior of the house fully equals the exterior in living up to its title, "The House of the Modern Age."

The house is assembled entirely from standardized parts of cold-rolled, copper-bearing sheets. Outside wall panels are 14-gage, in widths of 2 ft. and 4 ft. with a

standard height of 9 ft. Structural clamps hold together these panels, which before being assembled in the frame are filled with National insulation, a special granular fire-proof mineral, a non-conductor of heat and electricity, and has an insulating value similar to that of ground cork or rock wool. Used to a thickness of $3\frac{1}{2}$ in. in the walls, it is said to be equal in insulating value to 52 in. of brick. The roof is also covered with insulation, which is mixed with asphalt and other binders to form a monolithic slab.

The roof is supported by stiffeners made of 6-in. channels formed from 12-gage sheets, which serve as joists to which the panels are clamped. Partitions are also formed of sheet steel panels clamped together. Window panels in any style and any design, including French and casement windows, may be ordered. In this house, nearly all windows are located at corners of the house, the air conditioning unit eliminating the need



THE pleasant sun terrace upon which window casements and doors, and the house an appearance of solidity and

FRONT view of the House of the Modern Age, showing entrance, and balcony type second floor windows.



BUILT OF STEEL.....

By ROBERT BINGHAM

The Iron Age, New York



Two bedrooms open—notice the steel beveled edge of the roof which gives the size it otherwise would not possess.

for cross ventilation in the rooms.

Anchor bolts are set in the foundation, which is composed of insulated and water-proofed concrete 6-in. thick. All interior walls are sprayed with a rustproof paint, which has been known to protect sheet steel for 15 years without further treatment. Exterior walls are covered with a new finish known as Velmar, containing marble and other ingredients to make it rustproof. This finish has a unique, soft appearance and is guaranteed to withstand exposure for at least five years without refinishing.

Through the ingenuity of William Van Alen, the architect who designed the Chrysler Building and who is the designer for National Houses, Inc., eight comfortable rooms have been joined together compactly in such a way that not only is no space wasted, but no sense of restriction or a feeling of being "cooped up" is felt. This home contains on the first floor a living room, dining room, kitchen, library and general utility room

with a built-in garage adjoining the patio. On the second floor are three bedrooms, a bath and a sun terrace. A patio graces the approach to the house, which is surrounded by landscaping. The utility room contains a General Electric air conditioning unit for summer and winter use. The construction of the house is such that it is completely movable and may be disassembled quickly, shipped to any point and reassembled without any major structural damage or appreciable loss.

Built to sell for about \$10,000, this Park Avenue steel house which contains 10 tons of steel, has larger and smaller brothers available in any design and any price. The fact that the parts are prefabricated does not restrict the style of the house, except that specifications must be in multiples of two. Flat roofs or sloping roofs may be ordered for either one- or two-story structures.

The house is open from 9:30 a.m. to 10 p.m.



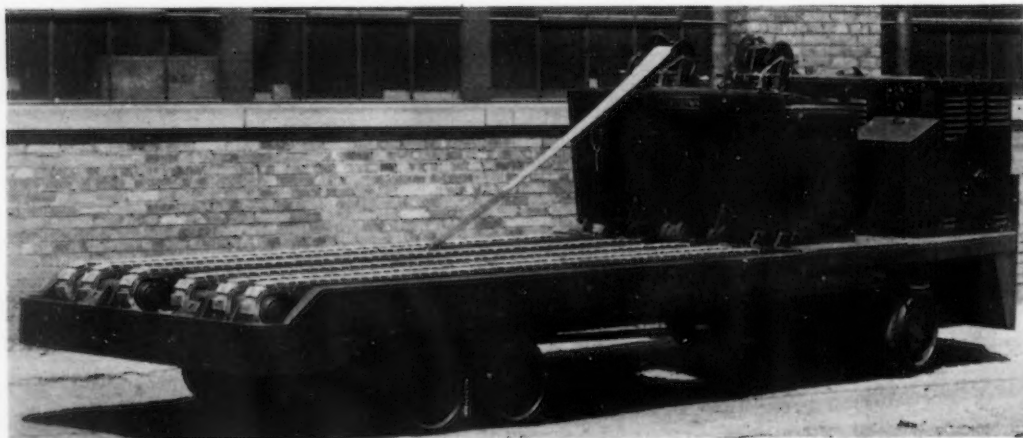
IMPROVEMENTS IN PRODUCTION

Industrial Truck with Power Driven Loading and Unloading Conveyor

AN industrial truck, having a power-driven conveyor platform, longitudinal movements of which provide self-loading and unloading ability, is a new

ated independently of the other three. When small coils are being handled they are carried on the two inner conveyors at either side. Large coils extend across the con-

veyor platform and rest on the six chains. When the truck is being loaded the coils move forward on the conveyor until there is a full load. In unloading, movement of the conveyor is reversed. The flexibility of control increases efficiency in handling coils to and from the truck. In case a large coil does not position straight across the platform, it can be straightened quickly



AT LEFT

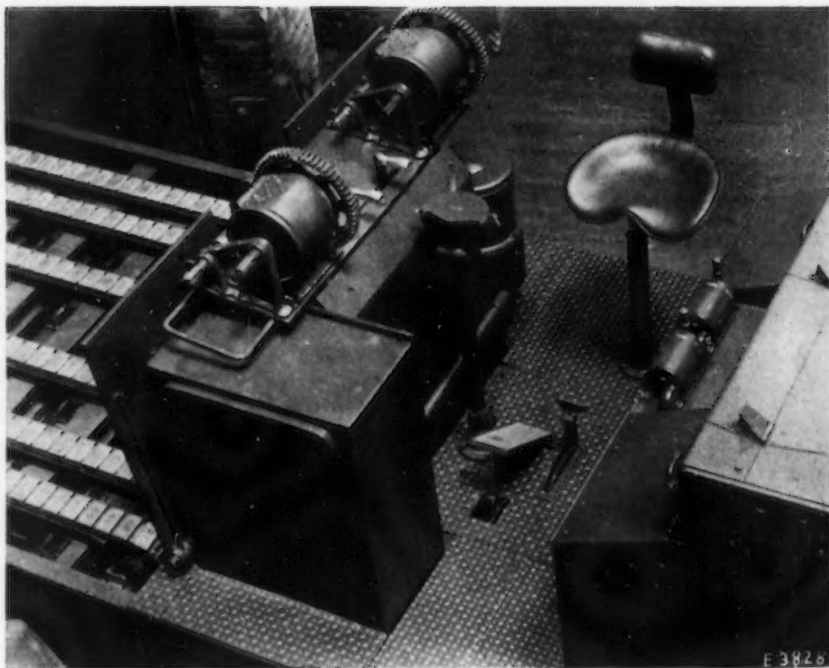
THIS conveyor-equipped truck is said to be the largest industrial transportation unit in the automotive field yet built.

BELOW

BOTH driving and operation of chain-conveyor lines are from a single seat arranged for convenient observation of all movements involved.

equipment by the Elwell-Parker Electric Co., Cleveland. Two of these trucks have been manufactured for a Chicago district sheet mill for transportation of coiled sheet steel from a continuous pickler to cold reduction mills. Truck capacity is 40,000 lb., weight 23,000 lb., and overall length approximately 21 ft. The platform is 144 in. long and 76 in. wide. The truck conveyor receives its load from another longitudinal conveyor, with which it stands end to end. Coils are in 18, 36 and 76 in. widths.

The conveyor is of the roller chain type with six conveying chain lines mounted on different centers, the outer two being about 8 in. apart and the inner two spaced at somewhat greater distance from the outer two and from each other. The conveyor chains have forward and reverse movements and the six may be operated together or the three on one side may be oper-



AND SHOP EQUIPMENT...



by operating the conveyors on one side while the other three remain motionless.

At the front end of the platform are two bumper plates connected to limit switches and when a coil moves the length of the platform and strikes one of these plates the conveyor automatically stops. The conveyor chains have a variable speed up to 18 ft. per min.

Coil rolling, while the truck is in motion, is prevented by two belts, mounted on reels on the top of the control housing. The end of a belt is drawn from a reel and hooked back of the last coil in one of four eyes that extend up from the frame structure between the conveyor chains.

Three motors are employed, one for steering, effortless power steering being a feature, one for driving and the third for operating the conveyor. Directional control is by lever in convenient reach at the driver's left. The seat position gives a clear vision both forward and back. The steering control lever is at the top of a steering post at the side of the driver's seat. Travel speeds, both of truck and conveyor platform, are controlled by foot accelerator. Ample foot-applied braking is provided.

The power plant is a 25-kw. Ready-Power gas electric unit; 60-volt motors are used. The drive to the conveyor is through a planetary gear reduction to the drive shaft and through sprockets and chain to a countershaft, sprockets on the latter driving the conveyor chain.

Truck drive is by two wheels, 22 1/4 in. in diameter and 14 in. wide. At the trailer end are four wheels with 18 1/4 x 14-in. tires. The rear axle shaft is designed to rock longitudinally to assure smooth running on an uneven roadway.

During tests, this truck, loaded with 51,000 lb., quickly accelerated from a dead stop to 4.5 miles per hr.

Vertical Miller and Profiler for High-Speed Single or General Use

PRATT & WHITNEY Division, Niles - Bement - Pond Co., Hartford, Conn., announces a new high-speed vertical miller and profiler, model No. 12B. The machine is available with either one or two spindles, and can be supplied for single or general purpose work.

As in the company's previous profilers, the spindles travel longitudinally on a cross slide while the table travels transversely between two columns. A separate driving motor for each spindle is mounted vertically on a hinged bracket at

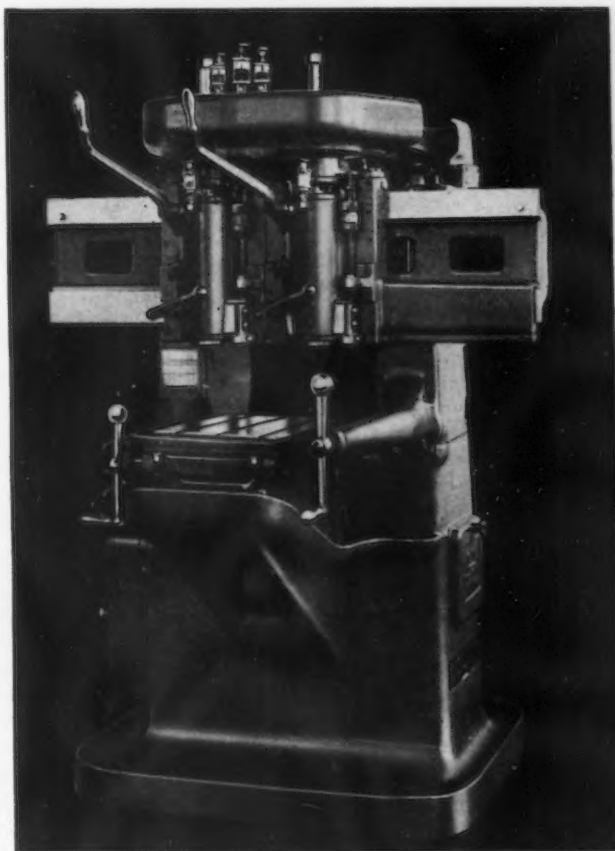
the rear, and drives through multiple V-belts; brackets are hung on ball bearings and swing freely. Belt tension is maintained by a radius rod and turnbuckle for each motor.

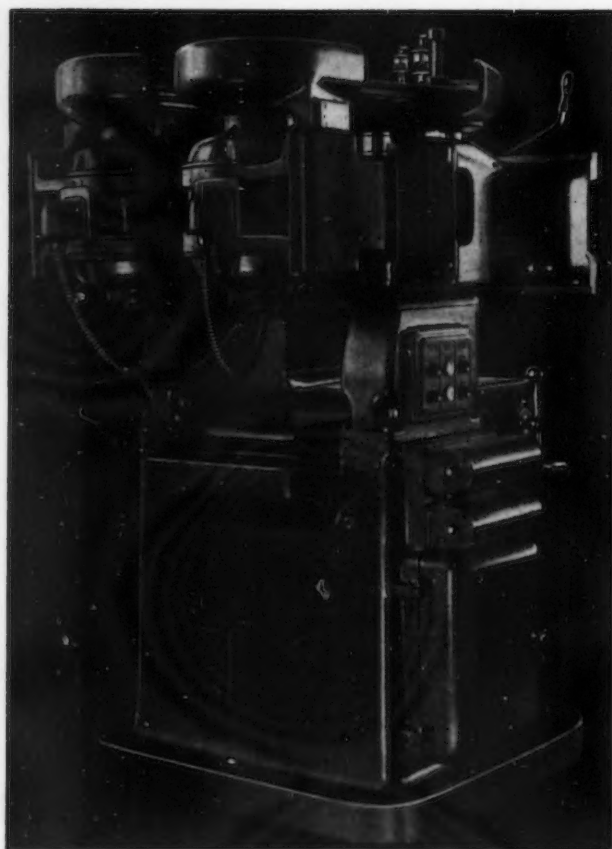
When supplied for general-purpose work, the spindles are driven individually by four-speed motors, with motor and spindle pulleys interchangeable. The arrangement gives eight available spindle speeds—300, 450, 600, 900, 1200, 1800, 2400 and 3600 r.p.m. These provide a range of high speeds for cutting

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THIS new miller and profiler, by Pratt & Whitney, is available to meet manufacturing needs for either large production or variety of work, at high speeds.

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FOR production work, the spindles are driven by individual constant-speed motors and step pulleys. For general purpose work, individual spindle drive is by four-speed motors, with motor and spindle pulleys interchangeable.

○ ○ ○

a narrow guide for accurate alignment.

The table rides on one truncated vee and one flat way and is strapped in place. The truncated V-way is fitted on both sides and on the top. Both the table and cross-slide are lever-operated through a rack and pinion drive, and these controls are ball bearing mounted throughout. Electrical control apparatus is contained in a compartment at the left of the bed and is accessible through a hinged cover. Individual controls are provided for the four-speed motors, with push buttons for starting and stopping.

Table working surface measures 14 x 18 in.; table travel is 20 in. There is 8 in. clearance between table top and the bottom of the cross-slide. Cross-slide transverse movement is 22½ in. for the two-spindle machine and 27½ in. for the single spindle machine. Distance between the two spindles is 12 in., and distance between spindle and guide pin is 4½. Total distance between uprights is 20 in. Brown and Sharpe, No. 9, taper holes are provided in the spindles. Weight of the single spindle machine is 3900 lb., and of the two-spindle machine 4460 lb. Each occupies a floor space of 68 x 70½ in., and are 78½ in. high.

Special equipment, consisting of adjustable cross-slide and table stops, raising blocks for increased capacity, a complete range of cutters, and pump and piping equipment is available. The latter is pad-mounted on the rear of the bed; a motor-driven pump draws coolant from a bed reservoir.

practically any material efficiently.

As a single-purpose machine, constant-speed individual motors are used with step pulleys, giving four-spindle speed range based on whatever may be the speed rating of the 1-hp., 50 or 60-cycle, a.c. driving motors installed.

Drive pulleys are mounted on ball bearings, which are lubricated by two sight-feed oilers on top of the head. A third and larger sight-feed oiler lubricates all slides in the head and cross rail.

The spindles are mounted in slides and have a vertical travel of 4½ in. Minimum and maximum distance from table top to spindle end is 3½ in. and 8 in. respectively. Each spindle is mounted in two preloaded precision ball bearings at the bottom and a single floating ball bearing at the top. A built-in spring acts as a counterweight to spindle and slide.

Cutters are held in the spindle nose by a draw-bar, which operates from the top of the machine. By turning it in the opposite direction, this draw-bar also functions as a positive knockout for cutters, eliminating necessity for driving cutters out, with attending strains on spindle bearings.

Spindle slides are traversed vertically by large levers. The cross-slides are provided with weight-compensating rolls for easy operation. Vertical and adjustable posi-

tive stops, each having a dial graduated in thousandths, are provided. A horizontal lever in front of each spindle locks the slide in any position. One former-pin block is provided for the left, and two for the right-hand spindle.

The spindle head slides on a scraped cross-rail. All slides are equipped with taper gibs, and have

Multiple Spindle Screw Machine Line Presents New Operating Conveniences

IN a new line, model 61, six and four-spindle automatic screw machines, the New Britain-Gridley Machine Co., New Britain, Conn., has retained and refined characteristic features of preceding models and has added to tool adjustability through a new design of tool holder. Refinements provide that all operating mechanisms are free from chip interference, that tool spaces are opened up and that unit mechanisms and control or change-over points are more easily reached.

The new line includes three six-spindle sizes, 1½, 2 and 2½ in., and two four-spindle sizes, 2½ and 3 in. bar capacities. In general design, the machines are alike.

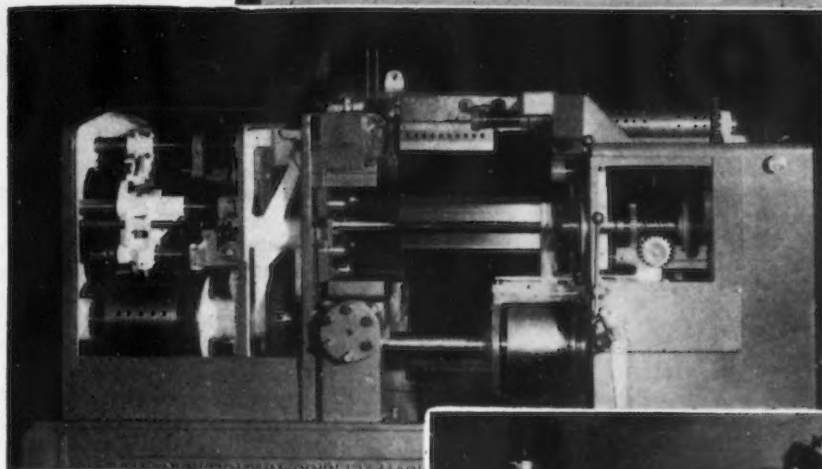
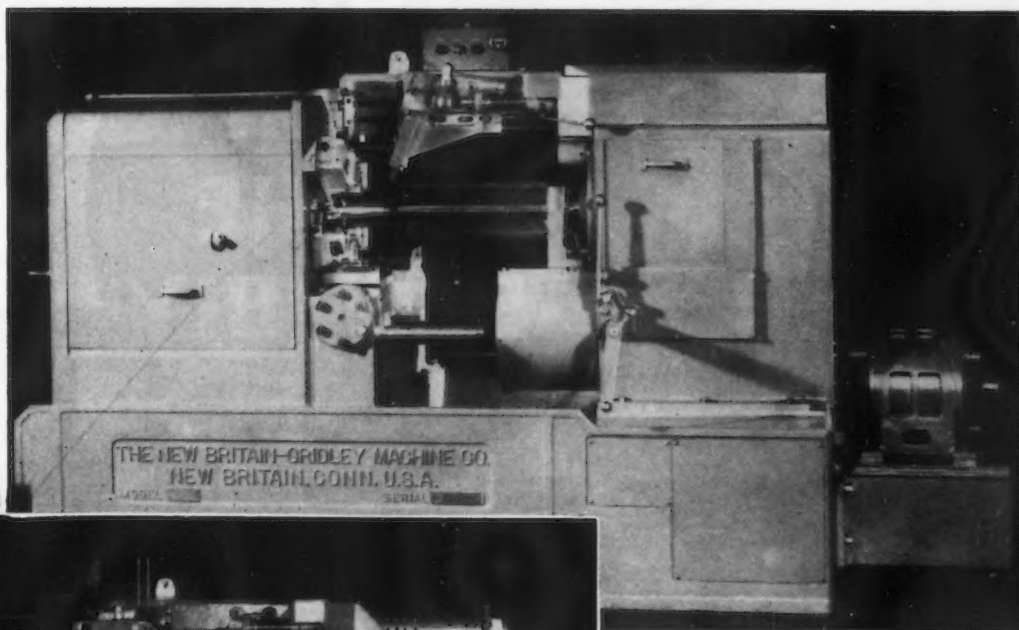
The headstock, base and power box are bolted and doweled, with the headstock and power box connected by an overhead member giving the effect of integral construction. The spindle carrier and the tool-slide stem are also assembled for integral effect.

Characteristic method of lifting the carrier for indexing movement was described in *THE IRON AGE* of April 11, 1935, and involves the elimination of wear on highly finished carrier surfaces on which the carrier rests while tools are in cut. The indexing is by a modified Geneva motion.

A hexagonal main tool slide is employed in the six-spindle and a square slide in the four-spindle

machines; the slide operating cam is entirely inclosed, but readily accessible.

Three main forming slides are mounted on cylindrical, hardened and ground studs carried in heavy sections which are cast integral with the base and head-stock; large circular bearing



area is thus provided. The cut-off slide, and an optional No. 5 position forming slide on the six-spindle model, are of flat-gibbed type and carried on hardened and ground ways.

All cross-slide-holder bases are hardened and ground, with T-slots set parallel to the centerline of spindles; micrometer adjustments

tools in the stock-feeding position. An electric throw-out operates automatically to stop the machine in loading position, with the collet open, if and when stock is exhausted in any spindle, and gives a warning-light signal to the operator. This stop is also semi-automatic in operation to provide

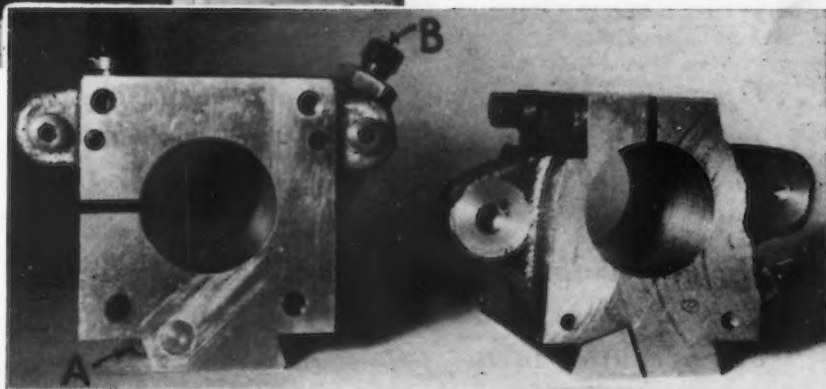


FIG. 1

FIG. 2

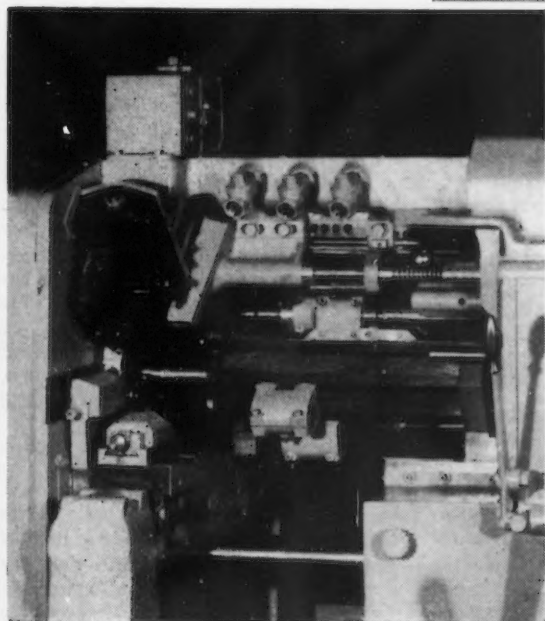


FIG. 3

are provided for positioning. Accelerated tool operations may be carried on in three positions, independent of the main tool slide and, in two positions, independent of the other slides. A self-opening die mechanism can be utilized in any or all positions. Stock feed is by spring and cam-operated mechanism with provision for quick cam change. The gage stop is of disappearing type, permitting the use of work

for a complete cycle in setting up.

A tool holder of new design has been provided for these model 61 machines. It features marked convenience and flexibility in tool setting and involves a wide possibility of use. The insert, Fig. 3, shows two holders in position on a main tool-slide. A screw-throw tongue wedge provides for either slight adjustment or easy, quick removal. The principle involved is illustrated in Fig. 1—a small wedge or tongue *A*, swings on its stud, as the screw *B* is turned, and serves to lock the holder against the right-hand V, or to permit adjustment or removal by lifting the holder. As shown in Fig. 2, the new holder also provides that a bronze gib may be used, rather than the swinging member; the gib is adjustable by a series of three screws.

THIS WEEK ON THE ASSEMBLY LINE



... Automotive volume maintained at high level, but first week in August will see a general tendency for plants to shut down for change-over.

o o o

... Ford Motor postpones its scheduled shut-down from 1st of August until 13th or 15th.

o o o

... Operating efficiency of plants at peak as first half earnings show much greater proportional rise than production over a similar period in 1935.

o o o

... Die and tooling programs being delayed by lack of capacity in jobbing shops together with shortage of skilled men.

DETROIT, Aug. 4.

AUTOMOTIVE production executives cannot recall a summer in their memory when production was maintained at such a high level right up to the first of August, even though in other years model announcements were made in January and the shut-down did not come until November. This year production during July has been maintained at a phenomenal pace up to the point when several of the leading manufacturers are beginning to shut down for change-over purposes. Beginning Aug. 3, there were five such plants shut down, principally producers of cars in the medium price class, although the large volume producers are continuing at an even pace.

Total production of passenger

cars and trucks for the United States and Canada was estimated at 97,755 units by Ward's Automotive Reports for the week ending August 1. This compares with the previous week's total of 99,329 units and with an approximate total of 69,615 a year ago this week. Of the Big Three, the General Motors group showed the most falling-off, accounting for about three-quarters of the drop of 1574 units. The week just closed rounds out a month of activity for July that passes all records since 1929 and represents sustained activity for which it is hard to find a comparison. August output is estimated at 250,000 units, although the first week's production should show a drop of not more than 10 per cent, as three more plants terminated produc-

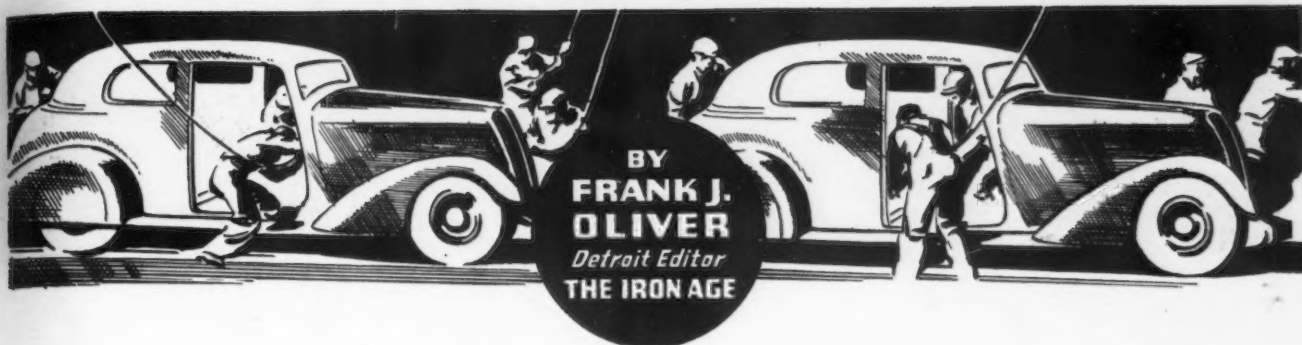
tion last week on the present series.

At the last minute Ford Motor Co. rescinded its plans to shut down for two weeks commencing Saturday, Aug. 1 and instead will run for at least ten days in August and perhaps two weeks. As a result, there was a mad scramble on Friday to get parts shipments going that had been held up until the plant reopening, originally scheduled for Aug. 17. Ford will continue to turn out approximately 5000 cars a day until the shut-down period is finally determined upon. An unforeseen rise in sales volume has been the reason for the change in schedule. But whether the Rouge plant shuts down or not, Ford Motor will continue to operate its blast furnaces and open hearths at full capacity, building up a bank of ingots and finished steel for its new models.

Chevrolet, faced with the largest change-over program in its history, will continue to operate its machine shop for at least this week or perhaps longer. Assembly plants throughout the country should operate through the month on banks of motors and stampings fabricated during the past few weeks. Plymouth plans also to assemble cars throughout the month, although its machine shop is scheduled to shut down on Aug. 22. Other units of General Motors have already gone down, including Oldsmobile, Buick and Cadillac.

Steel Releases to Come Soon

Practically all steel sizes are now known for the 1937 models and it is expected that releases will come through on contracts very shortly. In fact, steel is



already being rolled and shipped in quantities to a number of plants, particularly those companies which are expected to get into production on the new models during August. This group includes three of the important independents.

Although orders in this district for July are not comparable with the June figure, orders for steel have held up remarkably well and reflect hardly more than a slight dip in the sales picture. One cold-rolled strip mill in this vicinity, in fact, reported July as one of the best months in its history. Although releases on tonnages for the new models are small at present, they should increase steadily in volume during the next few weeks.

Henry Ford celebrated his seventy-third birthday last week by taking a trip to his northern camp on one of his ore boats. Before he left he made this significant remark about possible improvements in automobiles:

"They can be made lighter, stronger, more economical to operate and still cheaper to buy. No reason why that line of improvement should ever stop."

By these remarks, it looks as if Mr. Ford has written his own ticket for the light-weight, low-cost, economy Ford car, incorporating a midget V-8 engine and said to be ready for introduction to the market in early September. It is also significant that the Junior Car Club of Great Britain, which came over on the *Queen Mary* recently, should be guests of the Ford Motor Co. as a part of their rapid-fire tour of the United States and Canada in their own small cars.

More than a few people in the

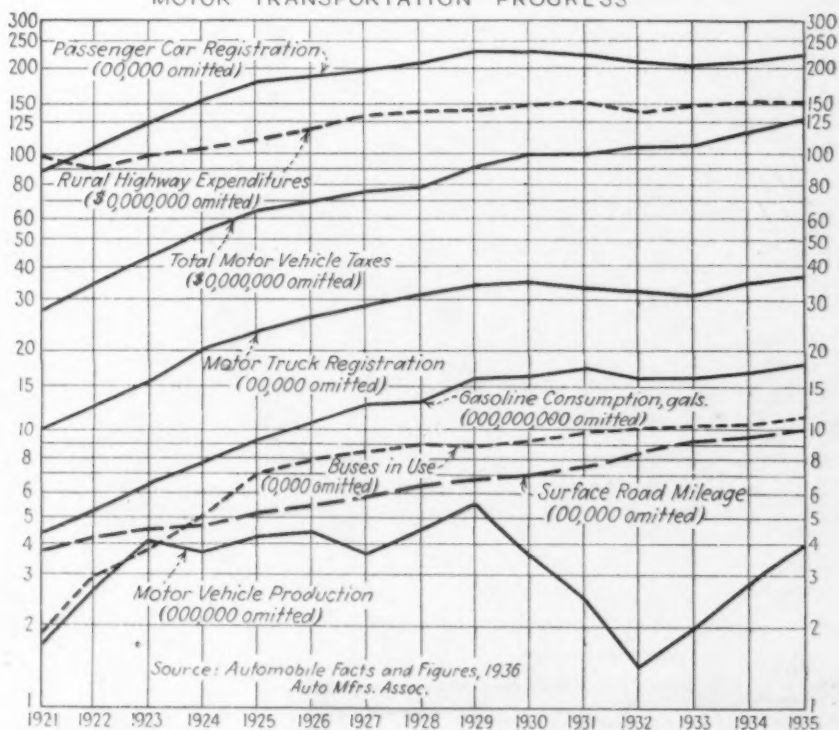
facturers' Assn. will have its New York Show on Nov. 11, members may announce prior to that date within a limit of 60 days, which would make the deadline Sept. 12.

Earnings at Peak

Motor car earnings reflect the fine performance of the industry during the past quarter. Hudson reports earnings for the first six months of the year as the largest for any half year since the first half of 1930 and four times the earnings of 1935, first half. June quarter earnings were almost five times those of the 1935 June

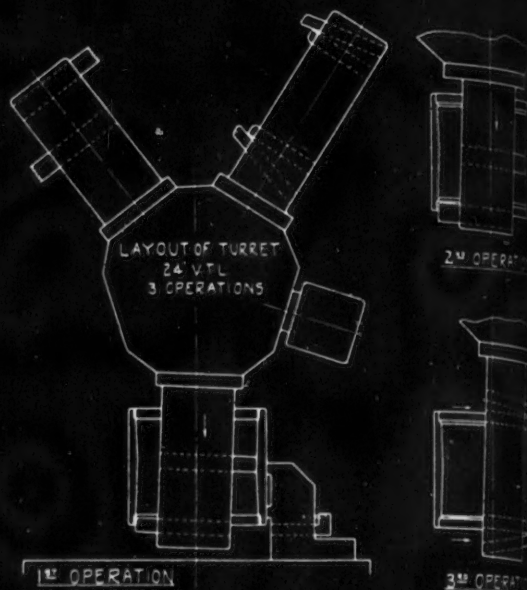
industry think that September would make a good introduction date rather than November, since it still leaves several months of fine driving weather in the early fall, whereas a middle November announcement is shortly followed by winter weather which is not conducive to much enthusiasm for car purchases. Although the Automobile Manu-

MOTOR TRANSPORTATION PROGRESS



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A CONICAL SOCKET IN 8 MINUT
FLOOR TO FLOOR



24" HIGH SPEED VERTICAL TURRET LATHE

Piece Name— Conical Socket
Material— Wrought Iron
Attachments—Cutting Lubricant System,
Thread Cutting

OPERATIONS

Chuckling
Bore Inside Angles
Face Both Ends and
Counterbore Socket
Cut Threads
Unload

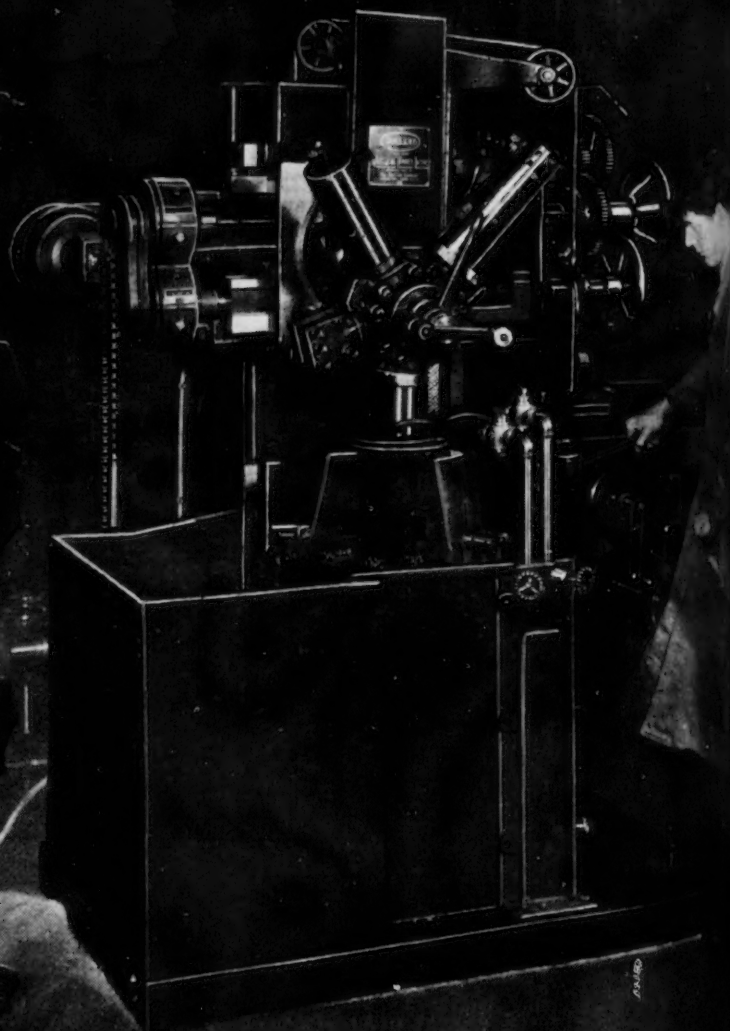
Floor to Floor Time—8 Minutes
Hourly Production—6.3 Pieces

If you have a similar problem job
or for that matter any problem job,
let us analyze it to your advantage.
Time Saved is Money Earned. If others
Profit, so can You.

THE BULLARD COMPANY

Bridgeport

Connecticut



quarter. Oddly enough, shipments for the half year were only 22 per cent greater than those for the previous year, indicating marked economies of operation effected during the regime of A. E. Barit, the new president. Packard shows for the first six months profits in excess of those for the entire previous year and over twelve times those of the first half of 1935. Deliveries of cars were approximately double for the corresponding period. Studebaker showed handsome profits in the second quarter, accounting for 90 per cent of the half year profit, as compared with a loss last year.

General Motors showed a gain of 60 per cent in profits for the first half year, earning \$140,572,546, or \$3.17 a share. Net earnings for the second quarter were \$2.00 a share. Chrysler Corp. earned \$6.83 a share, compared with \$4.31 for the first half of 1935. Declaration of a \$4 dividend was followed a few days later by an announcement of a \$2,000,000 cash disbursement to employees, beginning August 10. This bonus is the second of its kind this year, following one of \$2,300,000 distributed to 59,000 employees on February 14. The new payment will be made to the 65,000 employees who were on the payroll in the fourth quarter of 1935, each employee receiving \$25.00 plus \$1.00 for each year of service up to 10 years.

Chrysler can afford to be magnanimous this year for two rea-

sons: One is that the present run on 1936 models has exceeded all expectations, which means that tooling costs have been written off and that the added sales volume obtained is just so much gravy as far as this factor of cost is concerned. The other reason, of course, is the labor slant and the existence of a drive to organize all automobile workers. Then, too, Chrysler has a Works Council representation plan that is extremely effective from the employees' point of view in that questions of company income and wage rates are constantly being thrown up to the management. It is not entirely unlikely that Chrysler Works Councilors immediately asked the management "Where do we come in" as soon as the \$4 dividend was announced.

Willys-Overland Reorganized

Toledo cheers the reorganization of Willys-Overland into a new \$15,000,000 corporation chartered in Delaware under the name of Willys-Overland Motors, Inc. The new corporation expects to employ 5000 workers and make between 60,000 and 70,000 cars for the 1937 season, occupying about half of the old plant site and buildings. It is expected that some of the surplus property, including surplus machinery of the Willys-Overland Co., will be disposed of to liquidate back tax claims and to meet claims of creditors on the old organization.

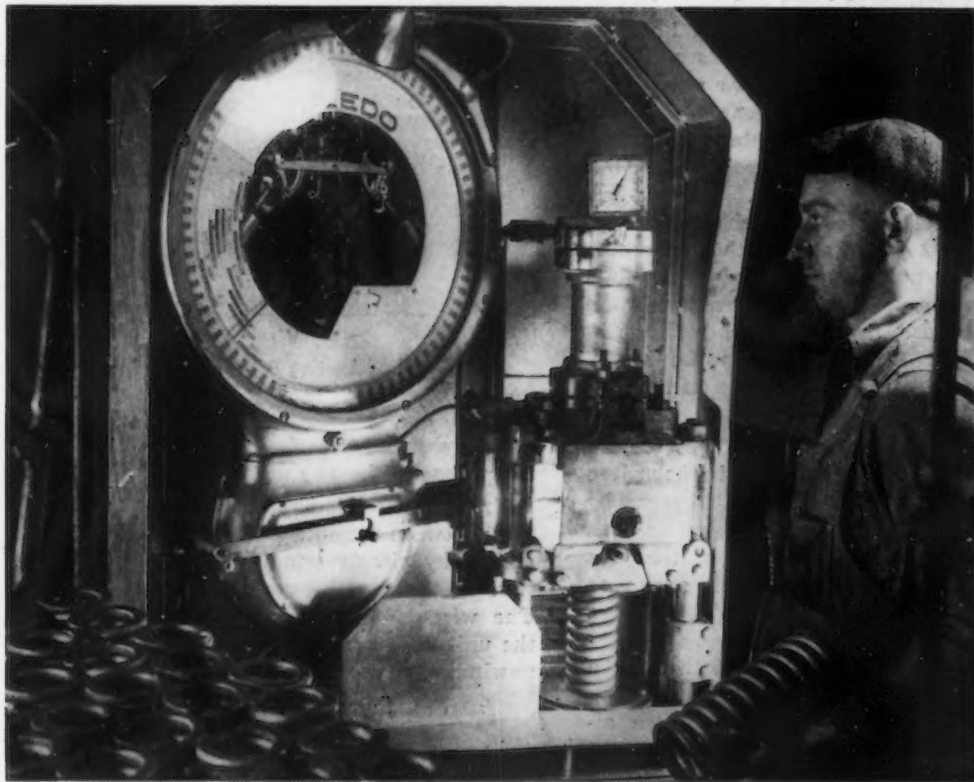
Detroit jobbing tool and die

shops are working at capacity and many of them are tied up for the next several months. There is no Keller die machine capacity available in this area and all horizontal boring mill capacity is said to be tied up until October. Incidentally, deliveries on new machines of this type are such that local jobbing shops could not increase their capacity along these lines before the end of the present tool and die program. Ford Motor Company was said recently to have checked on the available Keller machine capacity not only in the Detroit area, but over the entire country, to take care of die work being jobbed out.

Fisher Body stole a march on the rest of the crowd in early winter by tying up nearly all available Keller machines in this area at a contract rate of \$4.00 an hour, considered a bargain and better than their own costs. Forehandedness in this case was not entirely a blessing, however, since there have been a number of engineering changes in Fisher bodies called for at the last minute and which have resulted in the rebuilding of a number of dies constructed back in February and March. This sudden last minute spurt in its die program has also caught Fisher off base with a shortage of skilled men. Some of their best men have drifted away, owing to the fact that jobbing shops in this area pay a much higher rate than the large cor-

(CONCLUDED ON PAGE 69)

EVERY coil spring used in a Chevrolet knee action unit is carefully weighed to determine its characteristics. One test is to place a 6000-lb. load on the spring 30 times in rapid succession; the coil must withstand the load and return to its original length. In the photo, the operator is checking the weight that the spring requires to compress it to a height of 8 in.



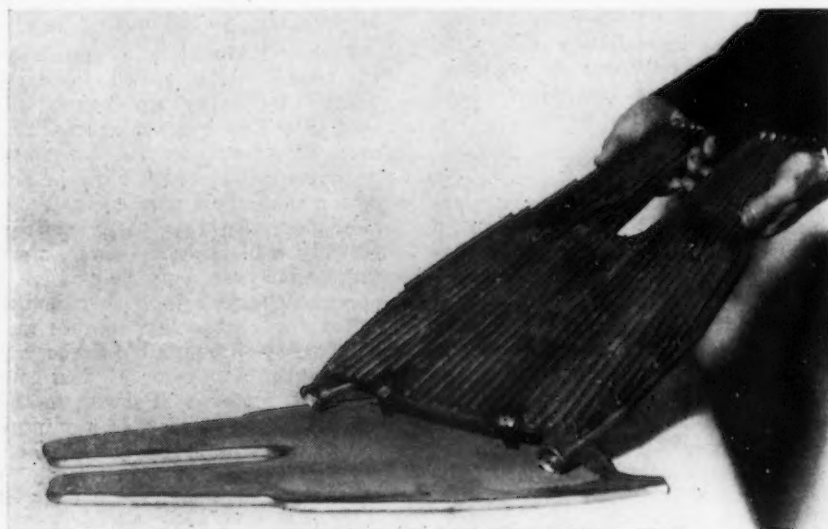
Progress in Electric Furnace Brazing

(CONCLUDED FROM PAGE 27)

ed that economies resulting from the adoption of the process paid for the brazing-furnace equipment in less than two months time.

Another Monel-metal job is shown in Fig. 9, which illustrates two cooling pads. These pads are made of Monel-metal throughout and consist of stampings pressed

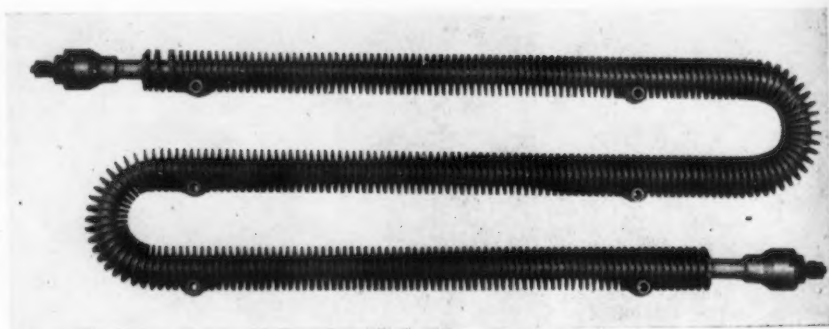
A special model of the G-E Calrod electric heating unit is shown in Fig. 10. Fins of edgewise-wound steel strip are copper-brazed in place on the steel sheath to increase the radiating efficiency of the unit several fold. The copper-brazed joint gives a permanency of the thermal conductivity be-



COOLING pads made of Monel-metal stampings and fins. The copper-brazing metal is sprayed on with a metalayer gun.

together to form the shell and of fins spot welded inside and outside for heat-transfer purposes. Monel-metal is used for two reasons; it has low eddy-current losses and good corrosion resistance. Cooling water circulates through the pads to carry away heat. Electric-furnace-brazing was chosen as the most practicable method of assuring uniformly strong tight joints and good heat conductivity of the bonds. Both of the pads shown in Fig. 10 have fins on the inside, while one also has fins on the outside.

The fins are first spot welded in place. Next copper in the molten state is sprayed on the parts by means of a Metalayer gun so that, when the two halves of the part are pressed together, it serves as brazing-metal within the joints. The assembled pads, weighing 6½ lb. each, are then put through a mesh-belt conveyor-type brazing furnace at 2060 F. and are allowed to be in the heat about 16 min.



G-E Calrod heating unit with steel fins wound edgewise and copper brazed.

tween sheath and fin which is unapproached by any other design.

Brazing-metal is supplied to the joint between the spiral fin and the sheath by simply winding copper wire on the part between the fins. The wire is tied at each end of the unit, of course, to keep it from unwinding.

Summary

As the applications discussed herein have shown, electric-fur-

nace-brazing is frequently substituted for some other process because of certain benefits obtainable and in some cases it has been used for development of completely new products. When employed on existing products it generally supersedes either torch-brazing, dip-brazing, soft soldering, welding, riveting, pinning, casting, forging, or machining from solid stock. All of these methods of fabricating or forming metal parts are firmly established, of course, but electric-furnace-brazing is now recognized as having a definite place among them.

Practically all modern automobiles and many leading brands of refrigerators contain several electric-furnace-brazed parts. In fact a large portion of the present list of users of electric-furnace-brazing either make or contribute parts for automobiles or refrigerators. Perhaps this is because of the dominance of these industries in the metal working field. In addition, electric-furnace-brazing plays an important part in the production of many of the leading brands of adding machines, accounting machines, cash registers, typewriters, radio receiving tubes, and sewing machines. Great strength of joints with resulting long life of the products is of utmost importance to

these manufacturers but they are attracted also by the tightness, uniformity of quality, and the excellent appearance of electric-furnace-brazed subassemblies. In brief, the simplicity with which complicated shapes can be fabricated at relatively low cost and the cleanliness of the work as it is delivered from the brazing furnaces have established the electric-furnace-brazing process in the metal working field.



TRIM, compact . . . neat, sanitary . . . light in weight, long in wear—it's a modern housing molded of Durez! Oster Manufacturing Co. picked Durez because: water, wear, perspiration won't dull the finish; it won't conduct heat from the motor; it

comes from the mold complete with slots, decoration, shaft-bearing and final finish—saving many production operations. You can do it better with Durez, too. Write for information and free monthly "Durez News".

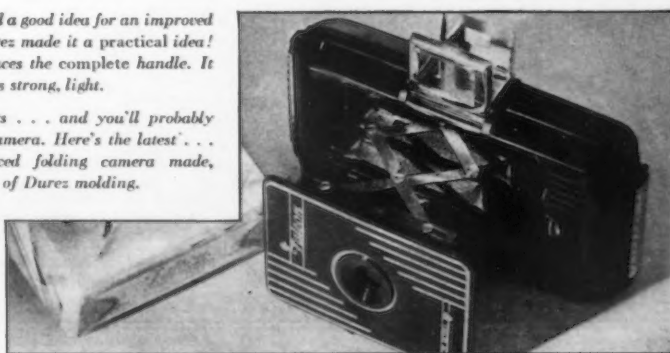
General Plastics, Inc.,
18 Walck Rd., N. Tonawanda, N.Y.

DUREZ



SCHELTER LAST CO., had a good idea for an improved shoe tree handle . . . and Durez made it a practical idea! One molding operation produces the complete handle. It has the friendliness of wood, is strong, light.

SHOOT a picture these days . . . and you'll probably do it with a molded Durez camera. Here's the latest . . . Falcon Jr.—the lowest-priced folding camera made, thanks largely to the economy of Durez molding.



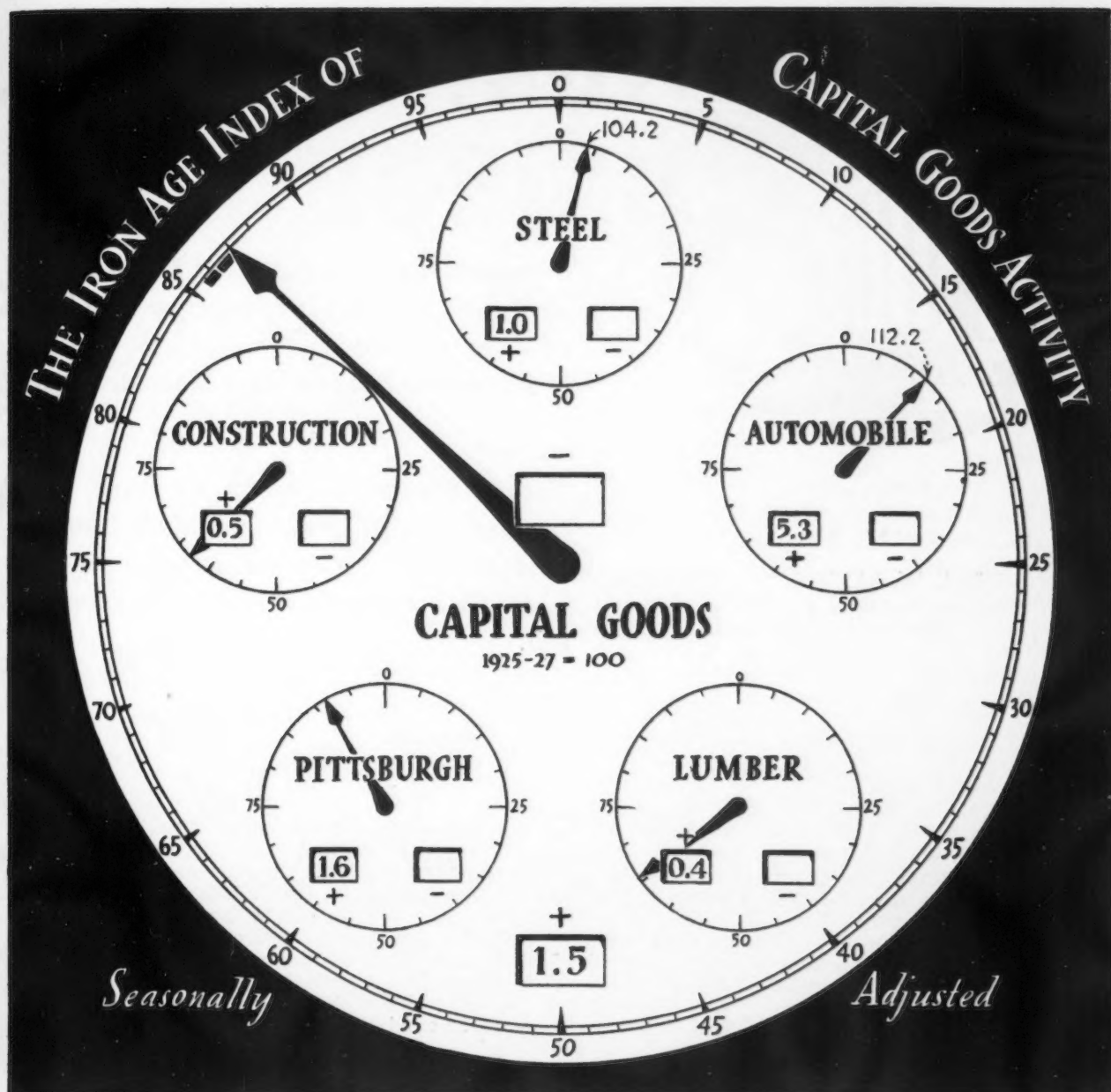
Current Metal Working Activity Statistically Shown

These Data Are Assembled by The Iron Age from Recognized Sources and Are Changed Regularly as More Recent Figures Are Made Available.

	June, 1936	May, 1936	June, 1935	Six Months, 1935	Six Months, 1936
Raw Materials:					
Lake ore consumption (gross tons) ^a	3,941,426	3,882,173	2,198,757	14,355,992	19,790,633
Coke production (net tons) ^b		3,837,323	2,660,113	17,022,748	
Pig Iron:					
Pig iron output—monthly (gross tons) ^c	2,586,240	2,648,401	1,552,514	9,799,000	13,528,226
Pig iron output—daily (gross tons) ^c	86,208	85,432	51,750	54,138	74,331
Castings:					
Malleable castings—production (net tons) ^d		45,027	27,548	231,897	
Malleable castings—orders (net tons) ^d		44,136	25,668	220,228	
Steel castings—production (net tons) ^d		64,246	27,665	180,925	
Steel castings—orders (net tons) ^d		63,950	30,257	182,370	
Steel Ingots:					
Steel ingot production—monthly (gross tons) ^e	3,984,845	4,046,253	2,258,664	16,042,651	21,326,335
Steel ingot production—daily (gross tons) ^e	153,263	155,625	90,347	103,501	136,707
Steel ingot production—per cent of capacity ^f	69.83	70.91	40.81	46.75	62.29
Finished Steel:					
Trackwork shipments (net tons) ^g	6,507	7,314	4,210	21,575	34,592
Steel rail orders (gross tons) ^g	13,200	8,800	22,250	275,057	596,348
Sheet steel sales (net tons) ^g	261,439	191,511	128,957	1,144,985	1,208,086
Sheet steel production (net tons) ^g	210,448	224,056	143,309	1,225,893	1,274,658
Fabricated shape orders (net tons) ^g	128,520	145,553	120,690	518,990	750,671
Fabricated shape shipments (net tons) ^g	150,790	134,623	91,608	504,638	677,414
Fabricated plate orders (net tons) ^g	51,999	51,257	17,914	99,462	229,482
Reinforcing bar awards (net tons) ^g	14,505	19,725	10,585	110,505	176,595
U. S. Steel Corp. shipments (tons) ^h	886,065	984,097	578,108	3,553,999	5,031,350
Ohio River steel shipments (net tons) ⁱ		86,004	80,620	408,648	
Fabricated Products:					
Automobile production, U. S. and Canada ^j	*445,000	480,571	376,993	2,373,173	2,570,422
Construction contracts, 37 Eastern States ^k	\$233,054,600	\$216,070,700	\$148,005,200	\$696,507,000	\$1,237,731,000
Steel barrel shipments (number) ^l		721,021	501,730	3,032,964	
Steel furniture shipments (dollars) ^l		\$1,451,199	\$1,137,173	\$6,898,572	
Steel boiler orders (sq. ft.) ^d		723,343	392,345	2,673,633	
Locomotive orders (number) ^m	24	10	3	16	122
Freight car orders (number) ^m	4,320	9,677	5,151	6,583	26,554
Machine tool index ⁿ	128.8	118.9	91.1	76.7	124.5
Foundry equipment index ^o	141.4	165.4	100.2	79.6	
Foreign Trade:					
Total iron and steel imports (gross tons) ^p	59,910	59,391	33,208	182,891	319,145
Imports of pig iron (gross tons) ^p	16,793	15,296	6,583	53,486	97,507
Imports of all rolled steel (gross tons) ^p	15,715	20,994	19,678	92,972	123,768
Total iron and steel exports (gross tons) ^p		314,950	289,687	1,595,934	
Exports of all rolled steel (gross tons) ^p		93,686	65,319	411,313	
Exports of finished steel (gross tons) ^p		86,346	60,643	365,105	
Exports of scrap (gross tons) ^p		217,439	215,098	1,115,942	
British Production:					
British pig iron production (gross tons) ^r	644,100	661,000	529,300	3,173,000	3,749,100
British steel ingot production (gross tons) ^r	965,900	963,000	770,000	4,801,200	5,744,200
Non-Ferrous Metals:					
Lead production (net tons) ^s	38,818	41,551	33,002	192,479	224,015
Lead shipments (net tons) ^s	37,736	33,125	26,978	195,432	215,737
Zinc production (net tons) ^t	44,947	44,905	34,637	209,876	253,732
Zinc shipments (net tons) ^t	41,654	43,977	29,353	214,972	252,487
Deliveries of tin (gross tons) ^v	7,795	5,235	4,615	28,390	37,020

† Three months' average. * Estimated. ‡ Partially estimated.

Source of figures: ^a Lake Superior Iron Ore Association; ^b Bureau of Mines; ^c THE IRON AGE; ^d Bureau of the Census; ^e American Iron and Steel Institute; ^f National Association of Flat-Rolled Steel Manufacturers; ^g American Institute of Steel Construction; ^h United States Steel Corp.; ⁱ United States Engineer, Pittsburgh; ^j When preliminary, from Automobile Manufacturers Association—Final figures from Bureau of the Census; ^k F. W. Dodge Corp.; ^l Railway Age; ^m National Machine Tool Builders Association; ⁿ Foundry Equipment Manufacturers Association; ^o Department of Commerce; ^p British Iron and Steel Federation; ^q American Bureau of Metal Statistics; ^r American Zinc Institute, Inc.; ^s New York Commodities Exchange.



(Figures represent percentages of 1925-27 production)

Same Week Last Month	Preceding Week	Last Week		Same Week 1935	Same Week 1934	Same Week 1933
85.0	85.5	87.0	COMBINED INDEX	60.5	50.0	61.0
100.2	103.2	104.2	Steel Ingot Production	67.5	38.3	81.7
119.5	106.9	112.2	Automobile Production	82.0	66.6	65.3
66.1	65.0	65.4	Lumber Shipments	54.1	56.6	61.1
86.6	90.0	91.6	Pittsburgh Industrial Production	61.4	49.9	69.5
57.1	62.3	62.8	Heavy Engineering Construction	37.9	39.2	26.5

POST-SEASONAL activity in most heavy goods producing industries is reflected by another rise in THE IRON AGE weekly index of capital goods activity. For the period ended Aug. 1, the combined index mounted $1\frac{1}{2}$ points to attain a six-year record level of 87.0 per cent of the 1925-27 average. Not since the early part of August, 1930, has the index displayed greater strength in any given week. Compared with corresponding weeks in earlier years, the records show that 1935 has been exceeded by nearly 44 per cent, 1934 by 74 per cent, 1933 by 43 per cent, and 1932 by 160 per cent. It is still apparent, however, that the capital goods industries

are operating at low levels relative to 1929. In that year at this time THE IRON AGE's index stood at 125.5 per cent of average, or more than 44 per cent above the present figure.

Current indications are that unusual strength in the steel and automotive industries are live factors in the combined index's upward momentum. Last week, while all five components of the index registered gains, support derived principally from the aforementioned series. It is significant that both the steel and automobile indices are currently above normal, provided the 1925-27 average is any indication of what normal industrial conditions are.

Components of The Index (1) Steel Ingot Production Rate, from THE IRON AGE; (2) Automobile Production, from Cram's Reports, Inc.; (3) Revenue Freight Carloadings of Forest Products, from Association of American Railroads; (4) Industrial Productive Activity in Pittsburgh District, from Bureau of Business Research of University of Pittsburgh; (5) Heavy Construction Contract Awards, from *Engineering News-Record*.

WASHINGTON



... President Green of A.F. of L., in speech at National Press Club, warns union labor of danger in divided front. Likens Lewis to Napoleon in march on Moscow.

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... Senate resolution seeks to have tariff Commission pit farmer against industrialist through price comparisons, but Commission neatly ducks an impossible job.

By L. W. MOFFETT
Resident Washington Editor,
The Iron Age

WASHINGTON, Aug. 4.—President William Green of the American Federation of Labor, in a vigorous address before the National Press Club last Friday, threw down the gage of battle to the rebel Committee for Industrial Organization, headed by John L. Lewis. And he predicted failure of the committee's ambitious campaigns to organize the steel industry. Further, unless the breach is healed, Mr. Green saw a most serious threat to the future of the Federation. Never once did Mr. Green mention by name either the C. I. O. or Mr. Lewis. But there was no possible doubt that he was directing his verbal blows at them. He assailed them for forming a group upon adjournment of the Federation convention in Atlantic City last year to put into effect a minority decision of the convention. The convention, Mr. Green stated, by a vote of 18,000 to 10,000, adopted a 1936 organization policy. It voted down the proposed industrial organization policy, which the C. I. O. is attempting to effectuate.

Mr. Green emphasized the point that the controversy is not one of craft unionism against industrial unionism. The issue, he insisted, is whether or not the American Federation of Labor shall continue

to follow the majority rule, and whether or not the rule of the A. F. of L. shall be the supreme rule of organized labor. No organization, he declared, can live by factions and minorities. The Executive Council of the A. F. of L., Mr. Green declared, had been given a mandate and he served notice that he proposed to do all he could to see that it was obeyed.

Green Refuses to Surrender

Though stating that he would go to the extreme limit to unite the forces of organized labor, Mr. Green, in no uncertain terms, made it clear that he would not capitulate to the rebel unions. He said he would even resign his position if necessary to heal the breach.

"But," shouted Mr. Green, "we refuse to bend or yield or surrender to a minority."

This challenge was accepted as putting the seal of finality on the action of the Executive Council, then scheduled to meet on Monday to try the C. I. O. for "dual unionism" and rebellion.

Mr. Green charged that the C. I. O. blocked the A. F. of L. plan to organize the iron and steel industry. He said the plan was prevented "by other groups who outbid us when we appealed to the

Amalgamated Association of Iron, Steel and Tin Workers." Mr. Green's reference obviously was to the C. I. O. offer through Mr. Lewis to contribute \$500,000 to the steel campaign. He declared that the steel industry could not now be organized because of the family quarrel within the A. F. of L. Such organization, Mr. Green insisted, could be accomplished only by a solid front of the American Federation of Labor.

After he had completed his address, Mr. Green was asked questions, which related chiefly to the steel labor situation. Mr. Green said that steel employees do not get their due share of the wealth they create and unfavorably compared steel wages with those paid in other industries. Steel workers, he said, should organize to force their full strength on employers. He was asked if he believed there is any limit beyond which steel workers should not go in order to attain their demands. In reply to this query, with its violent implication, Mr. Green said that the steel workers should go the extreme "within the law." If steel is organized, he declared, it is necessary to have support of the entire organized labor movement. The American Federation of Labor, Mr. Green said, will organ-

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ize the steel industry if given an opportunity to do so.

In his address Mr. Green said that the American Federation of Labor applies both the craft union and the industrial union plans. However, he explained that trained workers want to capitalize and commercialize their genius so that they can force from employers the highest wage possible.

"They can't be regimented," said Mr. Green. "They can't be treated as sacks of salt, shifted here and there. They must be treated as men."

He said steel workers had responded in large numbers to the A. F. of L. organizing campaign under NRA, but that due to an internal war within the Amalgamated Association of Iron, Steel and Tin Workers, it was found impossible to promote the campaign further. Since then, however, he said the situation had been straightened out and the A. F. of L. was ready to resume the campaign when it was prevented from doing so by "other groups who outbid us."

Mr. Lewis and Napoleon

Mr. Lewis as an ambitious man and impending disaster in his organizing campaign clearly were in the mind of Mr. Green when he resorted to a historic reference.

"It is said that when Napoleon started for Moscow there were some wise counselors who advised against it," said Mr. Green, in

putting the final touch on his address, "but Napoleon rejected their sound advice and went on to Moscow." (Napoleon entered Russia with 600,000 soldiers. Retreating from Moscow, he entered the French frontier with 100,000.)

Previously, Mr. Green had thrown another shaft which also was manifestly directed at Mr. Lewis.

"Men may be impatient; be in a hurry; be filled with a consuming desire for glory," said Mr. Green. "But that doesn't change the real facts in this case."



Indian Pig Iron Exports to Japan Gain

Showing a steady increase, exports of Indian pig iron to Japan rose to 397,536 tons in the fiscal year 1935-36 (April-March) compared with 245,552 tons and 183,832 tons, respectively, in the two fiscal years immediately preceding, according to Trade Commissioner George C. Howard, Calcutta. Aggregate Indian exports of pig iron in the 1935-36 period amounted to 538,152 tons against 417,059 tons in 1934-35 and 377,514 tons in 1933-34. During the first four months of the current calendar year exports of Indian iron totaled 217,965 tons, compared with 129,338 tons and 105,626 tons, respectively, in the corresponding periods of 1935 and 1934.

India Seeks Air-Conditioning

THAT India may become a steadily expanding market for air-conditioning equipment is indicated in a report to the Commerce Department from Trade Commissioner George C. Howard, Calcutta. American manufacturers in a position to supply a self-contained room-cooling apparatus which can be equipped to operate on 220 volt electric current, either alternating current or direct current, which can be delivered in Calcutta at from 600 to 750 rupees (\$225 to \$275) would find it to their advantage to give the Indian market their consideration, the Trade Commissioner believes.



Light Motor Trains Cheaper to Operate

THE direct maintenance and operating expenses of light weight passenger trains propelled by steam locomotives were 87.75c. per train mile and 11.79c. per car mile during the three months ended Sept. 30, 1935, compared with 85.11c. per train mile and 11.26c. per car mile for the conventional type passenger trains propelled by steam locomotives during the year 1934, according to a study made by the Bureau of Statistics, Interstate Commerce Commission. For light weight passenger motor-car trains, like expenses during the third quarter of last year were 32.16c. per train mile and 10.50c. per car mile, against 42.29c. per train mile and 15.69c. per car mile for the conventional type passenger motor-car trains during 1934.

In making the survey regarding light weight passenger trains, the commission pointed out that no attempt was made to appraise the significance of this recent development in train service. It was stated that a longer experience will be necessary to permit conclusions as to standard costs for such trains. The study is quite comprehensive and was based on returns from a questionnaire showing that 18 new type light weight passenger trains, all streamlined, were operated by 11 Class I railroads during the third quarter of last year.

The metals employed in the construction of the cars of the different trains were stainless steel, aluminum alloy, Cor-Ten steel, and all-welded steel. The average weight, in working order, of the locomotive and tender of the light weight locomotives, is given as 486,667 lb., or 74 per cent of the average conventional weight of 653,333 lb. The all-welded steel

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cars of the Hiawathas of the Chicago, Milwaukee, St. Paul & Pacific Railroad, the Cor-Ten steel cars of the Abraham Lincoln of the Alton Railroad and the aluminum alloy cars of the Royal Blue of the Baltimore & Ohio Railroad, the report stated, are 31 per cent, 40 per cent and 46 per cent lighter, respectively, than equivalent cars of riveted steel construction. It was explained that the figures indicate only approximately the differences in the weights of cars made of the various metals because some aluminum was used in the construction of the Cor-Ten steel cars and some steel in the aluminum alloy cars. The steel weight of the Cor-Ten steel cars was given as about 30 per cent greater than that of the aluminum cars.

The aluminum alloy cars of the Royal Blue, the report said, cost \$740 per foot of inside length, or 57c. per pound of empty cars; the Cor-Ten steel cars of the Abraham Lincoln cost \$654 per foot, or 45c. per pound; and the all-welded steel cars of the Hiawathas cost \$346 per foot, or 23c. per pound.

"It is to be noted that the cost of the cars of the Royal Blue, Abraham Lincoln and Hiawathas vary inversely as to their weight," the report stated. "In other words, the lighter the cars the more expensive they are. However, it must be taken into consideration that the cost of the metal is only a part of the expense of manufacturing the cars."

Japanese Steel Exports Rise

EXPORTS of iron and steel from Japan in May totaled 55,134 metric tons, an increase of 14,790 tons over April, says a report received by the Department of Commerce from its Tokyo office, and represented the largest monthly total ever registered. The bulk of the increased trade was in plates, sheets, rails, wire and miscellaneous products. Declines were reflected in shipments of pipes, tubes, bars, rods and a few other products.

Imports of iron and steel into Japan in May amounted to 254,857 metric tons, an increase of 30 per cent over April and the largest monthly total of the current year. The principal feature of this trade as compared with May, 1935, was the marked decline in incoming shipments of scrap. Pig iron and semi-manufactured products declined to a lesser extent.

Tariff Commission Ducks Farm-Industry Price Survey

WASHINGTON, Aug. 4.—A shining example of petty politics was a Senate resolution passed at the recent session of Congress requiring the Tariff Commission to prepare information showing how tariffs affect prices paid by farmers for industrial products. On the face of it, it is seen that this cheap political play to farmers and its

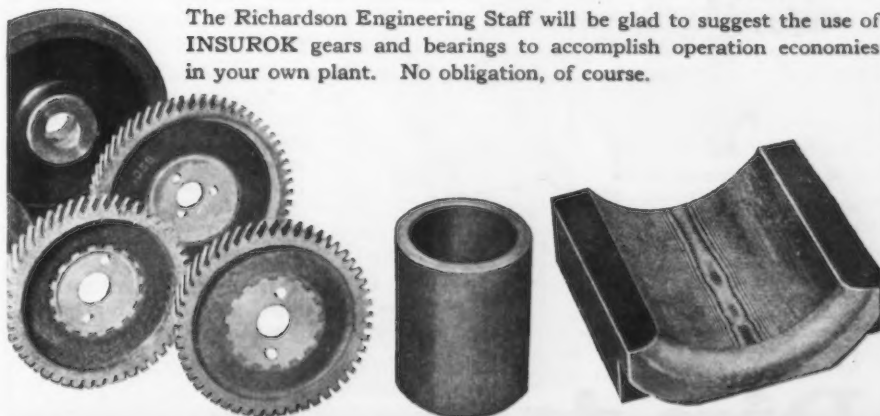
equally cheap effort to picture industrialists as greedily feasting on profits behind an impenetrable tariff wall could not be resolved into concrete figures. How could it be possible to say what part a tariff rate has in making the price of anything, either bought or sold by the farmer? The ramifications of the subject are so numerous and intricate that to nail it down

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to an exact science and thus to reduce it to terms of dollars and cents is utterly impossible. Sponsors of the resolution knew as much. It was the old political hocus pocus of simulating solicitude for the farmer, to gain his vote and it is strongly suspected that the farmer himself is aware of the fact and is growing disgusted with the performance. To the politicians the time, cost, and futility of such "investigations" mean nothing. It is not their time or cost and the futility is of no concern to them provided they think the desired political results have been achieved.

The Tariff Commission, however, faithful to its duty, went to work on the job, copied data from annual reports and other standard sources and produced a 106-page report. And it has frankly responded that the information is practically of no use. Indeed, so lacking in value is the report that two of the six members of the commission declined to consent to making it public.

The "information" relates to statutory net incomes by business groups; net incomes of individual corporations making more than \$1,000,000 in 1934; largest producers of nine tariff-protected groups and the relationship between prices and tariff rates; gross sales of three corporations of the nine which did the largest business in their particular fields. The consummate stupidity of the

resolution is reflected in the selection of 1934 to show "profits."

The resolution was the outgrowth of sharp criticism of the flood of checks issued by the AAA to farmers for killing pigs and plowing under crops or not planting for crops. Senator Vandenburg, of Michigan, in a resolution had asked Secretary of Agriculture Wallace to submit a report on AAA checks of more than \$10,000 which went to economic royalists in the field of agriculture. Senators from agricultural states, casting their political hooks, fished for political capital. They fell back on the time-worn tirade about tariff-protected industry. They declared the largess so freely handed out to farmers in the way of taxpayers' money was the farmers' tariff. Even with the checks, the cost to the public, so it was contended, was below the profits enjoyed by industry under the mighty shield of tariff protection.

Industry "Enjoyed" Big Deficits

What did the commission find? In the field of steel, the 1934 "profits," as reproduced by the commission report, the United States Steel Corp. "revealed" a deficit of \$21,667,780, the Republic Steel Corp. enjoyed a deficit of \$3,229,930 and the Bethlehem Steel Co. netted a bare \$550,571. What a rollicking saga of prosperity for "giant steel" under the aegis of "tariff protection!" Since a supine Congress has delegated its tariff-

making power to the Executive Branch, these zealous Senators, weeping onion-made tears over the farmer, should dry their eyes and, hat in hand, should plead with the State Department to shave by the maximum of 50 per cent the tariff duties on all industrial products except those made in their own states. And await a sure, swift and deserved kick from labor.

The commission itself rather neatly, it seems, informed the Senators of the asininity of the resolution.

"The commission," its three-member report said, "has earnestly striven to supply the information and estimates called for, but in attempting to do so has encountered insurmountable difficulties."

"Even if the commission had been able to furnish the specific information requested, it would not have been possible to use such information as a basis for estimating tariff benefits or the economic effect of the tariff upon the public."

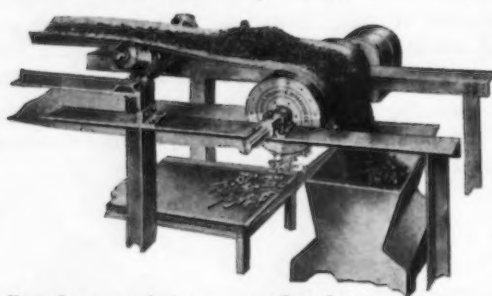
Wants Labor Displacement Survey

An equally silly inquiry, politically inspired, of course, is giving the Department of Labor a headache. It was requested by a resolution sponsored by Representative Palmsino of Baltimore. In effect this resolution calls upon the Department of Labor to submit information showing how much labor has been "displaced" by labor-saving devices that have been developed since 1912. At hearings on the resolution, a representative of the Department of Labor virtually informed the committee that it would be impossible to supply such information. Such a generalized resolution is insipid at the outset. Also it is based on an entirely false premise. For so-called labor-saving devices have created—not displaced, labor.

But such is wallowing statesmanship with an eye on the vote at any cost!

Appointment of the Industrial Supply Co. as its distributor at Salt Lake City, Utah, has been announced by the Lincoln Electric Co., Cleveland. Shield arc welders, Fleetweld and other Lincoln electrodes, arc welding accessories and various sizes and models of Linco-Weld motors will be carried in stock. Officers of the Industrial Supply Co., are: Rudolph Orlob, president; J. H. Oleson, vice-president and manager; and F. W. Squires, secretary. A. B. Kemp, manager of the welding division, was formerly welding instructor for the Provo, Utah, school board.

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LETTERS TO THE EDITOR

More About the New Bethanizing Process

USUALLY read my copy of THE IRON AGE rather carefully, but for some reason I missed the issue of May 21 in which there appeared an article on electrogalvanizing of wire by Arnold Weisselberg. My attention has been called to certain statements therein regarding my own work in this field, and in the interest of accuracy certain corrections are called for.

At the outset let me express my complete agreement with Mr. Weisselberg in his remarks as to the vital importance of proper cleaning of the wire before plating. It was this phase of the matter which gave us the most difficulty in the development of the Bethanizing process, because a great deal of wire contains non-metallic inclusions which are firmly held by the metal and more insoluble in acid than the steel itself. We were never able to get perfect coverage of all kinds of wire until our development of the "Nascent Sodium" cleaning process which by its nature removes all non-metallic substances from a metal surface.

With reference to this process, however, the article states that it has been found necessary to supplement this cleaning method by "still another electrolytic cleaning method employing an acid solution to insure complete removal of all the oxide and other impurities." This is not exactly correct; in fact the "Nascent Sodium" method alone has been used for the past year at Sparrows Point. However, a subsequent anodic treatment in spent electrolyte may be desirable to remove sponge iron (not oxide) if the original surface of the wire is considerably oxidized. Mechanical methods of removal of this sponge iron may, however, be substituted.

The article misses two essential points in comparing the Bethanizing process with the Cowper-Cowles patent of 40 years ago. It

is true that Cowper-Cowles proposed the use of insoluble anodes,

but the acid was neutralized as fast as it was set free by constantly circulating the solution through a bed of zinc dust and coke. Since zinc dust is more expensive than zinc metal, this process offers no fundamental economic advantage as compared with hot-dip galvanizing or plating with zinc anodes. In the Bethanizing process the zinc supply is derived from zinc ore, and is substantially cheaper than the metal itself.

Another point of difference even



5 More

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more important in regard to the quality of the final product is the difference of structure between zinc deposits derived from the strongly acid solutions which we employ and those from practically neutral solutions used with zinc anodes or by Cowper-Cowles. Mr. Weisselberg suggests that electrolytic deposits in general are porous and not tough and that the use of our conditions of operation accentuates this tendency. Actually the reverse is the case.

It is true that from neutral solutions there is a tendency to form porous deposits owing to the inclusion of zinc hydroxide which is precipitated by the setting free of OH ions in the cathode solution layer. This effect, however, cannot occur with strongly acid solutions and the deposits obtained at high densities from such solutions, as microscopic examination will show, are extremely dense and homogeneous. I have had on my desk for 10 years a paper-knife which was cut out of a single zinc cathode deposit about one-quarter of an inch thick, deposited from strongly acid solution at high density. This knife is strong and tough, and vibrates like a bell when struck. The section of the zinc at the sides and on the blade is as smooth and dense as in a piece of wrought metal. I hope to publish shortly some of our microscopic studies of zinc deposits produced under various conditions.

One or two minor corrections remain: The voltage necessary for plating under our conditions, is

from 4 to 5 volts, and not 10 volts as stated. The polishing treatment after plating is applied, not because the coating is "unsightly" (as a matter of fact it is crystalline and rather attractive), but because the life of the product will be longer as less surface area is initially exposed to corrosion.

Mr. Weisselberg presents interesting figures on the cost of galvanizing with zinc anodes. The extra price paid by the consumer for galvanized coatings may be considered as the purchase of so many pounds of zinc metal. With the present \$10 differential for, say 0.4 oz. coating, the price of zinc on No. 11 wire is approximately 25c. per lb. With, say one oz. coating, and the present \$15 differential, the cost is only 15c. per lb.

The cost of electrolytic production of zinc from ore falls remarkably steep as the plant capacity is increased. This explains why electrolytic zinc plants either die out (if below the critical size), or expand rapidly. It is this that has in 20 years brought electrolytic zinc production from nothing to 40 per cent of the world's total.

There follows from this an important difference between the old processes using metal and the new Bethanizing. A hot-dip galvanizer pays approximately the same for his metal whether he uses one ton per day or 20. An electrolytic zinc producer on the other hand, could make 20 tons at half the cost per pound of one ton per day. There are thus the same factors tending to increase the size of

Bethanizing plants as have been noted in the case of electrolytic zinc production in general.

U. C. TAINTON,
BALTIMORE, Md.

American Manganese Producers Protest Russian Agreement

"THE trade agreement recently concluded with Russia is an illegal and unauthorized document," J. Carson Adkerson, president of the American Manganese Producers Association, recently declared in a letter to the State Department.

"The State Department advises that the Russian agreement was not concluded under the authority of the Trade Agreements Act. We ask that the Secretary of State show under what authority it was concluded. The constitution requires approval by two-thirds majority of the Senate. No such approval has been given.

"Manganese producers have never been given proper hearings in accordance with testimony of representatives of the State Department before Congress and in accordance with the law embodied in the act.

"The Secretary of State uses census figures as to the number of men employed in manganese. This is grossly misleading.

"Most manganese mines are located in rural and mountainous areas. Employees are drawn from the surrounding communities and own or rent small farms and do light farming. Census classifies them as farmers.

"In the Batesville district of Arkansas more than 300 families normally obtain their subsistence from manganese operations. A small farm acreage is leased to the individual farmer and the farmer digs the ore. These men are classified as farmers."

Mr. Adkerson quotes figures to show that in 1929 there were 63 manganese operations under way in 17 states, employing more than 2400 men. "Any one of a number of manganese districts in the United States employed more men than the total credited by the State Department for the entire country.

"Full enjoyment of the normal domestic market would mean the ultimate employment of 12,000 men in the manganese industry.

"During the year 1931, without



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 Wyoming, Penna.
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recognition of Russia and without reciprocal trade agreements, the United States' exports to Russia amounted to \$103,717,000. The average for the years 1926-1930 was \$77,666,000. In 1936, with recognition and with reciprocal trade agreements, the United States is surrendering revenue, sacrificing national defense and giving valuable concessions to obtain from the Soviets an agreement that they will purchase from us a total of \$30,000,000."



FINANCIAL NOTES

Inland Steel Co. and subsidiaries showed a net profit for the quarter ended June 30 of \$3,298,191, after depreciation, depletion, estimated income taxes and other charges, which equals \$2.29 a share on 1,440,000 shares. In the first quarter this year net profit was \$1,934,632, or \$1.34 a share on 1,440,000 shares, and in the second quarter of 1935 net profit was \$2,392,510, or \$1.99 a share on 1,200,000 shares outstanding at that time.

Ludlum Steel Co. and subsidiaries earned a consolidated net income of \$271,369 after income taxes and other charges which equals 55c. a share on 495,477 shares of \$1 par common stock after allowing for dividends paid on the \$6.50 cumulative convertible preferred stock which was called for redemption May 4. Net income for the preceding quarter was \$163,012, or 26c. a share on 397,094 common shares then outstanding, and for the June quarter of 1935 net income was \$147,063, or 37c. each on 202,155 common shares.

Jones & Laughlin Steel Corp. earned \$1,115,733 in the June quarter, compared with net loss of \$933,279 for the first quarter, thus ending the first six months with a net profit. Income for the second quarter equals \$1.90 each on 587,139 shares of 7 per cent cumulative preferred stock, and 15c. each on 576,320 shares of common stock. In the June quarter in 1935 only 7c. each was earned on the preferred shares.

Republic Steel Corp. earned in the June quarter \$2,661,062, bringing net earnings for the first half of 1936 to \$3,022,094 after all charges, compared with \$2,756,563 for the first half of 1935. Charges for the first half included non-recurring dividends and guaranteed dividends amounting to \$431,503.76, with Federal taxes estimated at \$772,793.

Wheeling Steel Corp. and subsidiaries for the quarter ended June 30 earned a net profit of \$871,277 after all charges, which equals 77c. a share on 387,685 common shares after quarterly dividend re-

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ing "Cam Lock" feature...
the Modern end mill design
for keeping costs low.

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END MILLS**



quirements on 6 per cent preferred stock, on which accumulated unpaid dividends amount to 25½ per cent. In the first quarter \$10,922 was earned, equal to 3c. a share on preferred stock, and in the June quarter last year \$668,300 profit enabled the payment of 25c. a common share after regular preferred dividends. For the six months' period net profit in 1936 was \$882,199, compared with \$1,602,871 in 1935. The decrease in earnings for 1936 was attributable to losses incurred by the flood and the recent strike at Portsmouth, Ohio.

Link-Belt Co., Chicago, reports for the first half of 1936 consolidated sales up 44.7

per cent and consolidated net profit up 42.4 per cent over the corresponding period of 1935. Indicated second quarter sales increased 36.6 per cent while net income gained 36.1 per cent compared with the like period of last year.

Inland Steel Co. and subsidiaries report second quarter net profit as the highest level in the history of the company. Net income for the three months ended June 30 amounted to \$3,298,191, equal to \$2.29 a share, compared with \$1,934,632 or \$1.34 a share in the preceding quarter. The highest earnings of any previous quarter totaled \$3,158,967.



"Spiral Two Lipped"

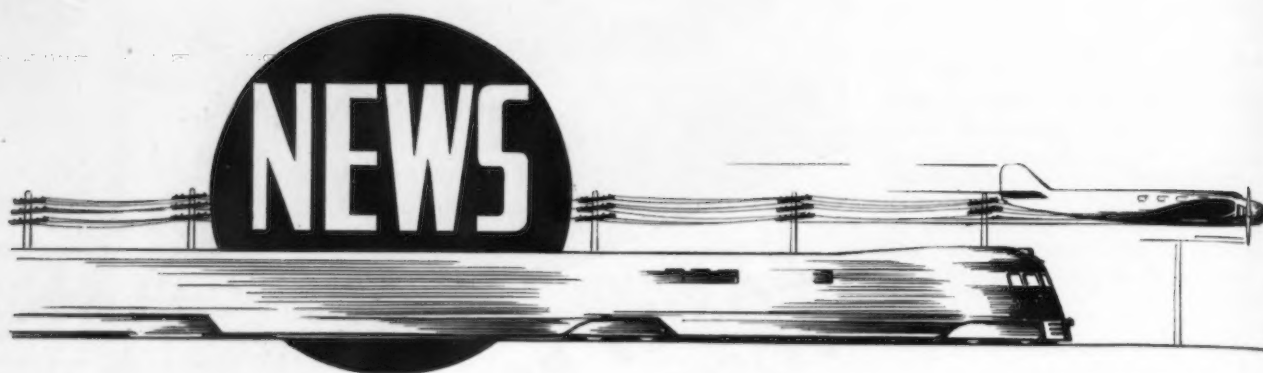


"Two Lipped"



"Spiral"

Ask for Catalog No. 32
listing complete line of "Cam
Lock" Cutter and Adapter equip-
ment. Brown & Sharpe Mfg. Co.,
Providence, R. I.



Steel Workers Demand Wage Rise; Reject Overtime Payment Plan

PITTSBURGH, Aug. 4.—Publication of better earnings for the second quarter, consistent demands from employee representatives for pay increases, rejection by some of the employee councils of the newly inaugurated overtime payment plan and the studied drive of the Steel Workers' Organizing Committee are a few of the factors exerting their pressure for a general wage increase in the steel industry.

While second quarter earnings have been the best, in many cases, for six years, nevertheless tremendous deficits have piled up over the lean years of the depression. Common stockholders in many of the companies have received no dividends in five years or more while wages and salaries have been ad-

vanced twice since the depression low. Employee representatives, however, have been bargaining for additional increases. This has been brought mainly about by the fact that total weekly payments have been below those received in 1929 since the industry has been operating on a 40-hr. week basis in order to spread available work as far as possible. More employees are on the payrolls at the present time than in the boom year, 1929.

That the employees desire the 40-hr. week is indicated in the rejection by employee representatives of the overtime plan at four of the large plants of the Carnegie-Illinois Steel Corp., namely the Clairton, Edgar Thompson, Monessen tin plate and Vandergrift plants. The plan is not favored by these repre-

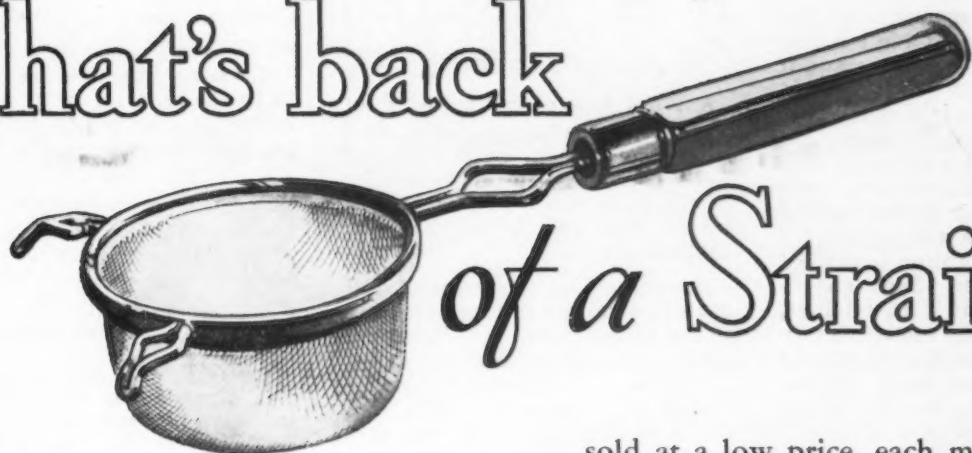
sentatives as it now stands. It calls for time and a half for all work over 8 hr. in one day and work over 48 hr. in any one week. The men, according to spokesmen, state that the overtime was not requested but that additional wage increases were sought. They would favor, it is said, overtime payments for work over 40-hr. in any one week. While some of the independent steel company representatives have not gone on record officially against the overtime set-up, nevertheless it is reported that some of the councils in the larger companies are of the same opinion as those in the Carnegie company, who rejected the plan.

Meanwhile the SWOC is making as much as possible out of the publicity given the action of the various employee committees. Complicating the situation somewhat for the steel companies is the recent wage advances by large outside concerns, such as the automobile and rubber companies, whose earn-

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What's back



of a Strainer?

TONNAGE

... for the men who must make it by the million to retail for a nickel;

... for the men who make the mesh;

... for the men who draw the wire;

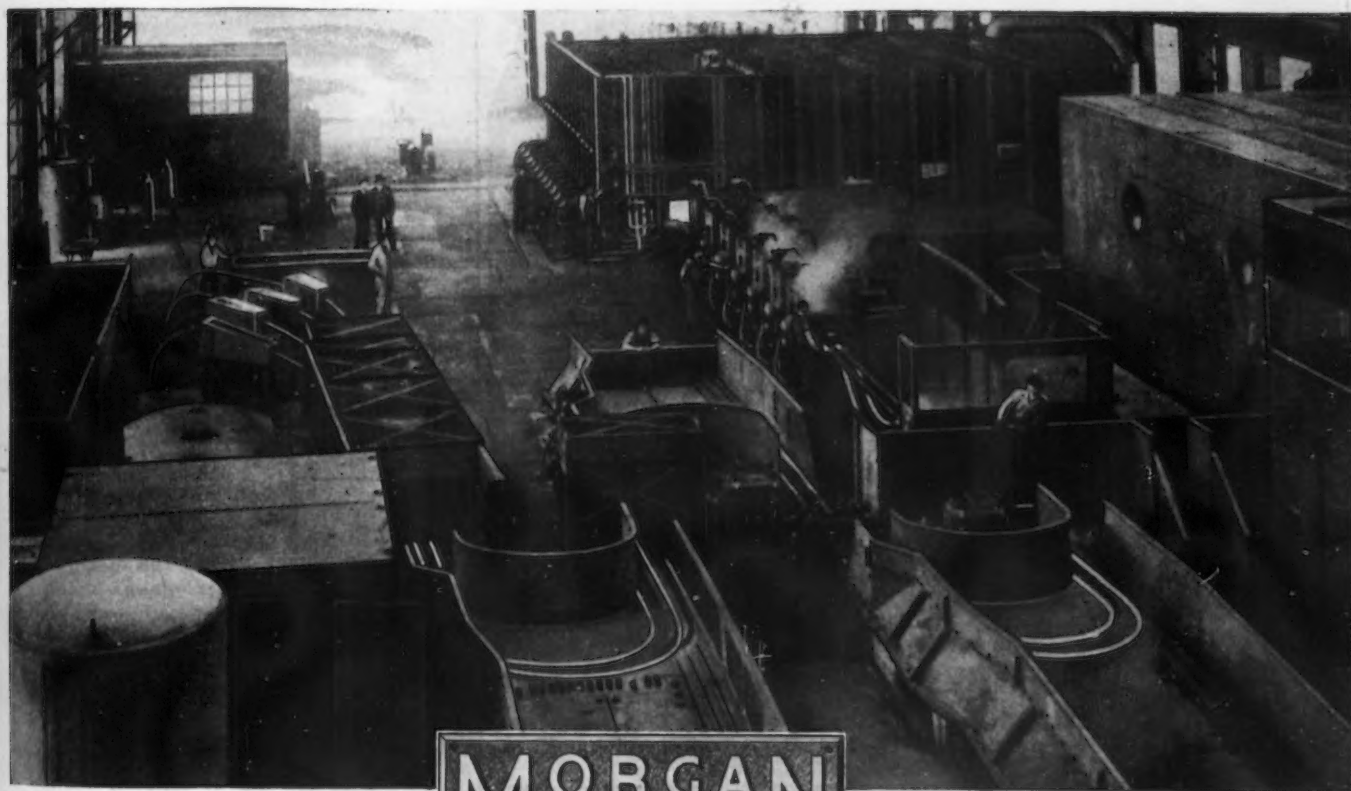
... for the men who roll the rods and strips; tonnage, dependent in every operation upon high output at uniform quality at low costs.

Can you roll rods at 4,000 feet per minute, within $\pm .005"$, and do it profitably? Not with equipment that is 20, 30, 40 years old. Yet one of your great markets today is represented by these hundreds of simple devices, each

sold at a low price, each made at low cost—a set-up that demands uniform quality and rapid output in *all* the steps leading up to the finished article.

* * *

Output uniformity requires coordination throughout the mill. From the original layout down to the finest detail, Morgan Continuous Rolling Mills are engineered as complete units to produce the required tonnage and desired accuracy. Experience plus sound engineering knowledge have produced the results which are back of the Morgan reputation today.



MORGAN
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MORGAN
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ings have been consistently better than the steel companies. It has been the intention of the steel industry to raise wages when and if earnings justified such action. Opinion of officials is that the time has not yet arrived. However, the factors mentioned previously may be powerful enough, combined with a better outlook for the last half of this year, to cause a change in the present view regarding a general increase in wages. Such an increase, when and if it materializes, will come when the steel industry feels that the action is economically sound. The future status of the overtime plan can not be determined at this time and it is not known whether it will be withdrawn or not.

Armco Develops New Galvanized Sheet

A NEW type of galvanized sheet called the "Armco Galvanized Paintgrip" sheet, which can be painted without special treatment of the surface has been developed by the American Rolling Mill Co., Middletown, Ohio.

Possessing all the value of full coated galvanized sheets, according to the maker, these new Paintgrip sheets are said to have the added protection of a special insulating coating that keeps the paint from direct contact with the zinc surface, and results in a galvanized metal with a good physical surface

for mechanical adhesion, plus chemical neutrality which retards aging of the paint.

Forming qualities are reported to be the same as when untreated galvanized sheets with corresponding weights of coating are used.

Granite City Steel Grants 2% Wage Rise

ABOUT 3000 employees of the Granite City Steel Co., Granite City, Ill., will receive a 2 per cent wage increase in the place of vacations with pay, according to Hayward Niedringhaus, president.

The increase is effective as of July 1 and is to extend for a period of one year, at which time, if a continued or an additional advance be desired, a new agreement must be reached between the union and company officials.

Alan Wood to Add To Sheet Equipment

THE Alan Wood Steel Co., Conshohocken, Pa., announces that, by fall, a complete range of hot-rolled annealed sheets will be added to its present list of products. Plans for the necessary improvements and additions have already been completed. Orders have been placed with the mill equipment manufacturers for mechanized units, and construction work is already under way to enlarge present existing buildings to accommodate the new equipment.

To Distribute New Cutting Alloy

THE new cutting material known as "Crobalt" will be distributed nationally by the Michigan Tool Co., Detroit. Details as to characteristics and performance are being temporarily withheld, but it has been learned that the material can be cast in permanent molds and that its nature and cost is such as to permit manufacture of entire cutting tools of this metal. It is also possible to weld, braze, or cement tips of the alloy to steel shanks or multiple-blade cutters. It is stated by the Michigan Tool Co. that the metal will be made available to other manufacturers of cutting tools and to machine tool builders.

**Lick that
Tough Drive
once and for all!**



These important advantages are found in no other one type of power drive.

- ★ QUIET
- ★ POSITIVE
- ★ DEPENDABLE
- ★ ECONOMICAL

Whitney Silent Chain Drives offer a solution to the most difficult drive problems. They have extra capacity for sudden overload, are not affected by atmospheric conditions and maintain positive and uniform production.

Whitney engineers will gladly cooperate on your drive problems. Write today for catalog V-112-A and further information.

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WHITNEY CHAIN DRIVES

POSITIVE POWER TRANSMISSION



..PERSONALS..

LEON C. REED has been named district sales manager and OTTO G. NEUMANN assistant district sales manager of Inland Steel Co's. newly established Chicago district sales office. Mr. Reed was born at Ashburnham, Mass., and studied at Kent College of Law in Chicago.



L. C. REED



O. G. NEUMANN

He became associated with Inland Steel Co. in 1909, starting in the order department, and was assigned to the sales department in 1920. He began calling on the trade in 1924, handling sales for the state of Indiana and the south side of Chicago. Mr. Neumann was born in Chicago, and attended Northwestern University. He was with Scully Steel & Iron Co. for five years, Jones & Laughlin Steel

Corp. for 11 years, and went with Inland in 1929 in the sales department, where he handled certain territories in Michigan and Ohio.



GEORGE C. CONGDON has been appointed manager of advertising and sales promotion and R. M. GIBBS assistant manager of advertising of the Jones & Laughlin Steel Corp. Mr. Congdon, who has been advertising manager of Jones

& Laughlin since 1929, will work with the general sales department in its sales promotion program in addition to continuing his supervision of advertising. Mr. Gibbs has been connected with the advertising department since 1930.



FRANK C. REED has been elected president of Westinghouse Electric Elevator Co. His headquarters will be at 1500 North Branch

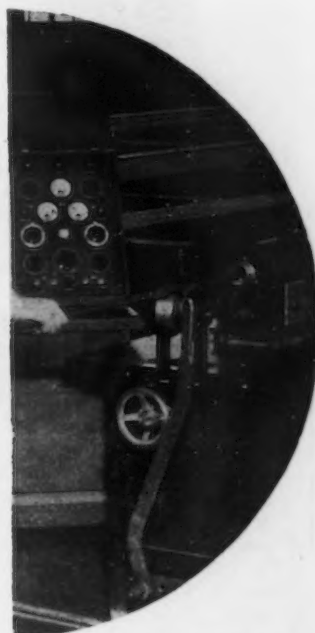


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Magnetic Analysis provides the ultimate in inspection methods. It detects hidden blemishes in the bar, and insures the highest grade stock.

WHEN ordinary steels fall short of your requirements, you can profitably substitute alloy steels and secure maximum steel stamina without increase of weight or section.

For shafting members or cut-from-the-bar parts, subject to heavy duty service, such as shock load, repeated vibration, metal fatigue, severe wear or unusually high fibre stresses—specify B & L Alloy Steels.

They are furnished in standard and modified analysis to meet special conditions—cold drawn to accurate dimensions and smooth finish—and available in rounds, flats, squares or hexagons.

Ask for your copy of the new
ALLOY STEEL FOLDER



Will see you at the
AMERICAN METAL
EXPOSITION, Cleve-
land, O., Oct. 19 to 23.
Space F-20

COLD DRAWN BARS AND SHAFTING • ULTRA-CUT STEEL • SPECIAL SECTIONS • ALLOY STEELS

BLISS & LAUGHLIN, INC.
HARVEY, ILL. Sales Offices in all Principal Cities BUFFALO, N.Y.



J. L. MILLER, Carnegie-Illinois Steel Corp., who has been elected secretary of the Association of Iron and Steel Engineers as mentioned in *THE IRON AGE*, July 30, p. 46.

Street, Chicago. Mr. Reed joined Westinghouse as an apprentice in 1903. Later he was transferred to the industrial sales department and in 1921 he was made manager of the Huntington, W. Va., office. In 1927 he was moved to Chicago as general sales manager and in March, 1931, he was elected a vice-president of the company.

F. M. GILLIES, assistant general superintendent, Inland Steel Co.,

will present a paper on "Material Handling Facilities in the Iron and Steel Industry" at the Iron and Steel Engineers' convention, which will be held Sept. 22 to 25 at Detroit.

SIDNEY THOMPSON has disposed of his holdings in the Defiance Screw Machine Products Co., Defiance, Ohio, of which he was president, to **L. F. SERRICK, INC.**, Defiance, and will enjoy a vacation after 45 years' affiliation with the screw machine products industry.

J. H. SICKLER, for the past six years purchasing agent of the Western Pipe & Steel Co., Los Angeles, has joined the Los Angeles sales force of the oil and gas field products division of the **A. O. Smith Corp.**, Milwaukee. He is a graduate of Stanford University and was previously assistant purchasing agent of the Belridge Oil Co.

J. H. REDHEAD, president and treasurer of the Lake City Malleable Co., Cleveland, has been elected executive vice-president and general manager of the Erie Malleable Iron Co., Erie, Pa. The receivership of the Erie company has been terminated. **ENOCH C. FILER** is president; **CHARLES G. STRICKLAND**, vice-president, and **RAY H. EISENLORD**, secretary and treasurer. Mr. Redhead continues at the head of the Lake City Malleable Co.

R. E. OTTO, heretofore assistant manager of motor sales for the Emerson Electric Mfg. Co., St. Louis, has been appointed manager of motor sales. **JOHN WRIGHT**, assistant manager of fan sales, has been made manager of fan sales. **O. D. METZ**, formerly manager of the company's New York office, has become assistant manager of motor sales, with **V. J. MAURER**, promoted to the managership of the New York office. **E. E. HARWOOD**, of the commercial engineering department, has been added to



JOHN W. BATES, Carnegie-Illinois Steel Corp., a new director of the Association of Iron and Steel Engineers, as mentioned in *THE IRON AGE*, July 30, p. 46.

ONLY SUPER-DREDNAUT GOGGLES CAN Provide MAXIMUM Eye Protection

The deep curve in Super-Drednaut Lenses plays the same important part as the curve or arch in bridge construction—both provide **ADDED STRENGTH**, and added strength in Super-Drednaut Lenses provides added protection to the eyes of workmen who wear Super-Drednaut Goggles.

And, another important fact, one that means **MAXIMUM** eye protection—is, that even if lens should become broken by a tremendous blow, the curvature tends to prevent the glass from being driven into the eye. **ONLY** curved lenses **CAN** give this protection.



Super-Drednaut 50-S Goggle

Super-Drednauts are daily preventing eye injuries to thousands of workmen, because they give **MAXIMUM** eye protection.

Send for a Super-Drednaut **TODAY.**

SAFETY EQUIPMENT SERVICE CO.
Buell W. Nutt, President 1228 St. Clair Ave., Cleveland, O.
Manufacturers of a Complete Line of Accident Prevention Equipment



the motor sales staff in the New York office.

GEORGE C. BRAINARD, president, General Fireproofing Co., Youngstown, has been made a director of the Federal Reserve Bank of Cleveland for a term expiring on Dec. 31, 1937.

JOSEPH WINLOCK, chief metallurgist, E. G. Budd Mfg. Co., Philadelphia, is to present a paper on "Sheet and Strip Steel for Deep Drawing" at the convention of the Association of Iron and Steel Engineers to be held in Detroit, Sept. 22 to 25.

C. R. JERNBERG, formerly vice-president of the Standard Forgings Co., Chicago, is now associated with the Kropp Forge Co., Chicago, maker of drop and steam hammer forgings. He will direct sales of the Kropp Forge Co. in the territory contiguous to Chicago, having charge of contract and production sales. Mr. Jernberg has been associated with the forging industry for over 20 years in various production, development and sales capacities, and is the inventor of several forging processes of major importance, including the making of forged plate type truck wheels and forged steel car wheels.

E. W. MILLER, chief engineer of the Fellows Gear Shaper Co., Springfield, Vt., sailed July 24 for an extended business trip to Europe. He will visit England, France, Italy, Germany and possibly Poland and Russia.

ELMER R. HAUSER, chief metallurgist of the National Tool Co., Cleveland, for the past 11 years, has been appointed research metallurgist of the Weldon Tool Co., 321 Frankfort Avenue, Cleveland. Mr. Hauser spent several years in the metallurgical laboratories of the Bourne-Fuller Co., now a division of the Republic Steel Corp., and is a graduate of the Case School of Applied Science, Cleveland.

HORACE C. DISSTON, manager of the steel sales department of Henry Disston & Sons, Inc., is captain of the field hockey team which will represent the United States in that sport at the Olympic games in Berlin. Mr. Disston is a graduate of Princeton, where he was a prominent athlete, and is a member of the Philadelphia Cricket Club.


Armco Appoints Five New Distributors

Appointment of five new distributors of Armco ingot iron and Armco stainless steel has been announced by the American Rolling Mill Co., Middletown, Ohio.

The Edgcomb Steel Co., Phila-

delphia, and the Edgcomb Steel Corp., Newark, N. J., have been named distributors of Armco stainless steel.

Those recently appointed to distribute Armo ingot iron are: Syracuse Supply Co., Syracuse, N. Y.; Alamo Iron Works, Brownsville and Corpus Christi, Tex.; Klauer Mfg. Co., Dubuque, Iowa, and the Central Steel & Wire Co., Chicago.



STRENGTH with LESS WEIGHT at LOW COST

You may find the answer to this major problem of modern engineering in "A.W." 70-90" Super Strength Steel.

Others have. A comprehensive booklet just issued, gives the plain facts and figures of "70-90" Steel and points out how others are even now profiting by the peculiar properties inherent in this "A.W." high tensile steel—and how transportation engineers have been especially successful in applying "70-90."

Let us mail you this booklet. Your need for a steel like this may or may not be immediate. In either case, it will be helpful and interesting to you to compare "A.W." 70-90" Steel with ordinary steels, and to check our charts of Safe Reductions, Physical and Chemical Properties, and other engineering data.

Write For Your Copy Today

Alan Wood staff engineers are fully equipped to discuss this remarkable new Super Strength Steel with you in every detail, and offer you competent cooperation in applying it to your own problems of design and construction.

PROPERTIES		
HIGH STRENGTH:	SEA	SEAA
Yield Point (lb. per sq. in.)	70,000 min.	50,000 min.
Tensile Strength (lb. per sq. in.)	90,000 min.	65,000 min.
Elongation (per cent in 2 in.)	20 min.	25 min.

OTHER "A.W." QUALITY PRODUCTS
Blue Annealed Sheet & Strip
Sheared Steel Plates
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"Swede" Pig Iron
"A.W." Diamond Types
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CONROSION RESISTANCE: Superior to all ordinary steels.
WELDABILITY: Excellent. No treatment to prevent brittleness required.
FABRICATION: Lends itself readily to difficult cold forming and cold bending.

ALAN WOOD STEEL COMPANY
CONSHOHOCKEN, PA.

Philadelphia New York Boston Los Angeles San Francisco Seattle Houston

110 YEARS' IRON AND STEEL MAKING EXPERIENCE

Pig Iron Daily Output

Slightly Lower in July

PRODUCTION of coke pig iron in July, at 2,594,268 gross tons, compares with 2,586,240 tons in June. The daily rate last month showed a decline of only 2.9 per cent from that of June, or from 86,208 tons to 83,686 tons.

On Aug. 1, there was a gain of one furnace making iron, 146 furnaces operating at a rate of 83,720 tons daily, against 145 furnaces one month before which were producing iron at a rate of 85,405 tons daily. Independent steel companies blew in three furnaces and took two off blast, and both the Steel Corporation and Merchant producers kept the same furnaces operating in July as in June.

Furnaces blown out or banked include: One Bethlehem furnace, Bethlehem Steel Co.; one Aliquippa, Jones & Laughlin Steel Corp., and one Portsmouth furnace of the Wheeling Steel Co.

The Bethlehem Steel Co. blew out or banked one of its Sparrows Point units.

Daily Average Production of Coke Pig Iron

	Gross Tons				
	1936	1935	1934	1933	1932
January	65,351	47,656	39,201	18,348	31,380
February	62,886	57,448	45,131	19,798	33,251
March	65,816	57,098	52,243	17,484	31,201
April	80,125	55,449	57,561	20,787	28,430
May	85,432	55,713	65,900	28,621	25,276
June	86,208	51,750	64,338	42,166	20,935
½ year	74,331	54,138	54,134	24,536	28,412
July	83,686	49,041	39,510	57,821	18,461
August		56,816	34,012	59,142	17,115
September		59,216	29,935	50,742	19,753
October		63,820	30,679	43,754	20,800
November		68,864	31,898	36,174	21,042
December		67,950	33,149	38,131	17,615
Year		67,556	43,592	26,199	23,733

Production of Coke Pig Iron and Ferromanganese

	Gross Tons		Ferromanganese†	
	Pig Iron*		1936	1935
	1936	1935		
January	2,025,885	1,477,336	24,766	10,048
February	1,823,706	1,608,552	24,988	12,288
March	2,040,311	1,770,028	22,725	17,762
April	2,403,683	1,663,475	19,667	18,302
May	2,648,401	1,727,095	18,363	17,541
June	2,586,240	1,552,514	17,549	12,961
½ year	13,528,226	9,799,000	128,058	88,902
July	2,594,268	1,520,263	20,205	13,175
August		1,761,286		12,735
September		1,776,476		15,983
October		1,978,411		19,007
November		2,065,913		18,245
December		2,106,453		17,126
Year		21,007,802		185,173

*These totals do not include charcoal pig iron.
†Included in pig iron figures.

Merchant Iron Made, Daily Rate

	Tons				
	1936	1935	1934	1933	1932
January	10,537	3,926	7,800	2,602	6,256
February	11,296	6,288	7,071	2,863	7,251
March	10,831	7,089	7,197	2,412	1,157
April	13,897	8,799	8,838	1,908	5,287
May	12,814	8,441	9,099	3,129	4,658
June	14,209	7,874	9,499	4,088	6,090
July	11,619	8,644	7,880	6,783	3,329
August		8,194	6,043	7,756	3,070
September		10,090	4,986	10,034	3,213
October		11,199	5,765	8,634	4,286
November		12,503	6,610	7,639	4,435
December		13,312	4,399	8,358	3,674

Production by Districts and Coke Furnaces in Blast

Furnaces	Production (Gross Tons)		August 1		July 1	
	July (31 Days)	June (30 Days)	Number In Blast	Operating Rate, Tons a Day	Number In Blast	Operating Rate, Tons a Day
New York:						
Buffalo	180,265	180,007	10	5,820	10	6,000
Other New York and Mass.	31,865	30,078	3	1,030	3	1,055
Pennsylvania:						
Lehigh Valley	55,146	46,318	5	1,940	4	1,545
Schuylkill Valley	23,229	23,556	2	750	2	785
Susquehanna and Lebanon Valleys	12,085	12,283	1	390	1	410
Ferromanganese			0		0	
Pittsburgh District	585,447	492,435	29	18,885	29	19,275
Ferro. and Spiegel	11,706	9,058	3	470	2	300
Shenango Valley	49,491	53,785	3	1,595	3	1,795
Western Pennsylvania	81,718	81,100	4	2,635	4	2,610
Ferro. and Spiegel	5,967	5,872	1	190	1	195
Maryland	83,247	92,648	3	2,190	4	3,090
Wheeling District	137,944	137,704	7	4,450	7	4,590
Ohio:						
Mahoning Valley	266,002	266,412	13	8,580	13	8,880
Central and Northern	238,513	239,246	13	7,695	13	7,975
Southern	12,896	10,694	3	690	2	320
Illinois and Indiana	540,337	523,036	25	17,430	25	17,575
Michigan and Minnesota	80,963	76,750	5	2,610	5	2,560
Colorado, Missouri and Utah	25,196	40,006	2	815	3	1,335
The South:						
Virginia			0		0	
Ferro. and Spiegel	2,532	2,619	1	80	1	90
Kentucky	25,888	13,395	2	835	2	780
Alabama	142,112	147,741	10	4,585	10	4,240
Ferromanganese			0		0	
Tennessee	1,719	1,497	1	55	1	50
Total	2,594,268	2,586,240	146	83,720	145	85,405

Granite City Steel to Use Armco Patents

THE Granite City Steel Co., Granite City, Ill., has been granted a license by the American Rolling Mill Co., Middletown, Ohio, to use its continuous sheet rolling patents and cross rolling patents, according to an announcement by C. R. Hook, president of Armco.

With the completion of this new continuous mill, the Granite City plant will be completely equipped for the production of hot and cold reduced sheets.

A CORRECTION

IN the article by Robert C. Woods entitled "Radium Inspection of Metal Structures" which appeared in THE IRON AGE July 16 on page 49, the credit line for the photographs accompanying this article was in error. The Radon Co. of 1 East 42nd St., New York, maker of X-ray equipment, and the Worthington Pump & Machinery Corp. supplied the photographs.

This Week on the Assembly Line

(CONCLUDED FROM PAGE 49)

puration die shops such as Fisher, Ford, Murray and Briggs. Whereas tops in those plants is \$1.10 an hour, it runs up to \$1.30 and occasionally \$1.50 for a good boring mill hand in a jobbing shop. Because there is a shortage of really skilled men, a lot of would-be die makers are making extravagant claims as to their ability and getting hired. This situation is resulting in spoiled work and increased costs. The condition is further complicated by the drive of the United Automobile Workers, who intend to take in tool and die makers as well as production men. Plants are growing uneasy on this score, as regards firing of men who do not measure up to standard.

Akron Peace

For the present, one threat against automotive production has subsided in the way of a six weeks' truce in the labor war at the Goodyear plant in Akron. Union leaders seem to have been at last able to get control of the sporadic sit-down strikes that occurred frequently without sanction from union officials. It is frankly stated, however, that the union's ultimate objective is a closed shop and union officials confidently expect to have about everybody in Goodyear signed up by September 1. An element in the situation that has aggravated unrest in the last few months, however, has been the fact that company union men belonging to the so-called "Assembly" have been using company time to drum up enthusiasm and members for the Assembly, or as the union officials put it, have been proselyting union men. It took the threat of Mayor Schroy of Akron to place the entire police force at Goodyear's disposal, if necessary, in order to keep its factories operating, to bring the guerilla warfare and unauthorized sit-downs to an end.

Observers have been watching Hupp's old engineering building in Detroit, recently sold to Goodyear, to see if any tire-making machinery might be going in. So far this is not the case.

New Cutting Metal

Reports from Detroit, regarding the coming national introduction of a new cutting metal were con-

firmed this week with a semi-official announcement from Michigan Tool Company that it has taken over National distribution of this new metal, to be known as "Crobalt."

The metal can be cast in permanent molds and its nature and cost are such as to permit manufacture of entire cutting tools. It is also possible to weld, braze, or cement tips of this metal to steel

shanks or multiple-blade cutters. Complete details as to the characteristics of the new alloy including reports as to its performance over the past several years in the plants of major automobile manufacturers, will be revealed in the next few weeks, according to officials of Michigan Tool Co., who also confirm the fact that the metal will be made available to other manufacturers of cutting tools and to machine tool builders.

PROFIT by the use of Thomastrip

Used for all classes of stamping, forming and drawing, Thomastrip specialized production cold rolled strip steel, has been the means of improving and lowering the cost of many products formerly cast, forged or made of brass . . . Made to specific requirements, Thomastrip provides dependable assurance of correct analysis, precision gauge, uniform temper and fine finish . . . Better product quality and greater production speed, with less waste and rejections, are definite advantages which can be gained by specification of Thomastrip . . . Investigate Thomastrip for your product. Without obligation, a Thomas representative will gladly cooperate with you.

Send for a copy of the new Thomas Handbook of valuable information on cold rolled strip steel.

THE THOMAS STEEL COMPANY
WARREN, OHIO
Specialized Producers of Cold Rolled Strip Steel



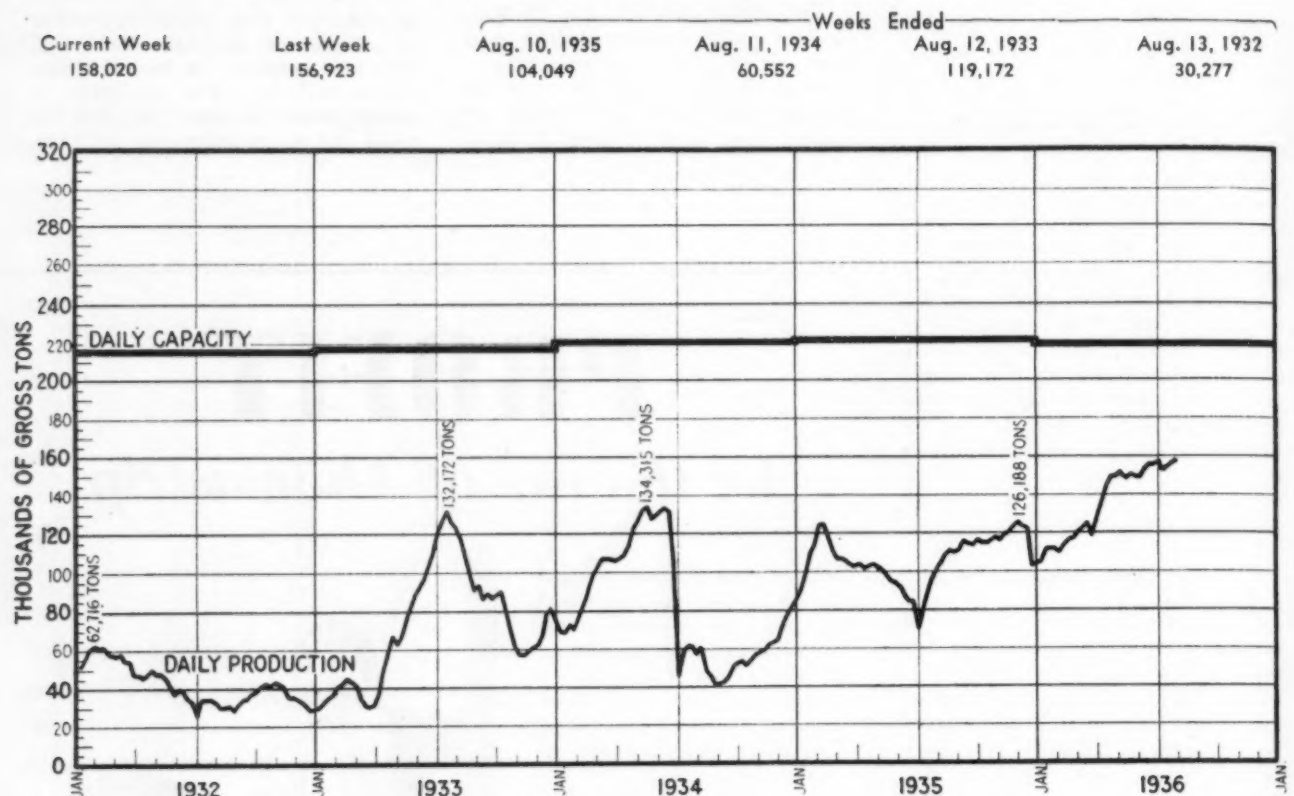
Thomas Strip

COLD ROLLED
STRIP STEEL

BRIGHT STEEL/ZINC COATED
COPPER COATED

STEEL INGOT PRODUCTION

Daily Tonnage of Bessemer and Open-Hearth Steel Ingots Produced by Weeks, 1932-1936



Latest values plotted on the above chart are for the past week in each case.

STEEL INGOT PRODUCTION BY DISTRICTS: Per Cent of Capacity

District	Current Week	Last Week	Weeks Ended		
			July 11, 1936	Aug. 10, 1935	Aug. 11, 1934
Pittsburgh	69.0	67.0	63.0	43.0	19.0
Chicago	73.0	72.5	72.0	54.0	31.0
Valleys	77.0	78.0	73.0	50.0	37.0
Philadelphia	55.0	53.0	50.0	28.0	22.0
Cleveland	80.0	77.0	79.0	50.0	24.0
Buffalo	77.5	79.0	90.0	38.0	30.0
Wheeling	94.0	96.0	94.0	75.0	27.0
Southern	54.0	54.0	52.0	33.0	25.0
Ohio River	81.0	82.0	70.0	60.0	25.0
Western	65.0	63.0	75.0	30.0	10.0
St. Louis	66.0	70.0	90.0	42.0	33.0
Detroit	100.0	100.0	100.0	95.0	75.0
Eastern	90.0	90.0	90.0	35.0	25.0
Aggregate	72.0	71.5	70.0	47.0	27.5
Average Year to Date	62.6	62.3	61.4	45.4	44.3

Weekly Booking of Construction Steel

FROM THE IRON AGE

	Week Ended				Year to Date	
	Aug. 4, 1936	July 28, 1936	July 7, 1936	Aug. 6, 1935	1936	1935
Fabricated structural steel awards.....	15,000	16,655	44,650	21,450	666,405	467,595
Fabricated plate awards.....	685	4,245	2,530	7,165	157,550	113,255
Steel sheet piling awards.....	275	160	0	2,300	33,970	32,785
Reinforcing bar awards.....	9,750	9,930	2,675	4,800	226,990	138,300
Total Lettings of Construction Steel....	25,710	30,990	49,855	35,715	1,084,915	751,935



...SUMMARY OF THE WEEK...

... Steel ingot production hits new high point for the year.

o o o

... New buying declines moderately, but mill backlogs are heavy.

o o o

... Steel scrap advances 50c to \$1 a ton in leading centers.

STEEL ingot production, at 72 per cent, has risen to a peak for the year thus far and in actual tonnage compares favorably with high marks in the several prosperous years that ended with 1929. The current rate is equivalent to a daily output of about 158,000 tons, which is only 19 per cent below the best record of 1929—195,255 tons a day in June. It also compares favorably with peak daily averages in previous years—172,221 tons in October, 1928; 168,867 tons in March, 1927; 165,504 tons in March, 1926; 161,321 tons in March, 1925; 161,796 tons in March, 1924, and 158,549 tons in April, 1923.

Despite a moderate decline in new buying, a continuation of approximately the present rate through August is assured by the heavy backlogs of orders on mill books. In fact, production and delivery problems are of greater concern to the mills at the moment than new business, as consumers are pressing for quicker shipments of steel which, in most instances, is going into immediate consumption. Backlogs are heaviest in plates, shapes and bars for construction uses and in sheets for miscellaneous requirements. On some sheet specialties deliveries run as long as six or seven weeks, a somewhat surprising situation considering the fear that new sheet rolling capacity of the continuous type was outstripping the country's ability to consume.

Meanwhile, steel mills are faced with higher costs because of the rapid advance in scrap prices, which this week are 50c. to \$1 a ton higher at leading centers, and they have yet to decide upon the wage increases that are demanded by workers at some mills. Should wage increases be granted, price increases for fourth quarter are likely to follow, and, in view of this possibility, a few steel companies have instructed sales offices to avoid commitments other than for identified construction projects that would require deliveries after Sept. 30. Legal counsel of some steel companies have given the opinion that shipments of the same

products at the same time at different prices, as has occurred during recent weeks, may be a violation of the Robinson-Patman act.

THIS week's production rate is one-half point higher than a week ago, reflecting increases in the Pittsburgh, Chicago, Cleveland-Lorain and eastern Pennsylvania districts. Output declined slightly only in the Valleys and at Buffalo. The demand for raw steel is sustained by pressing requirements for finished products from the construction industry, car builders, public utilities, railroads and a host of miscellaneous users. While shipments to the automotive industry have lessened as high production runs on 1936 models are completed prior to shutdowns for change-overs to new models, initial steel orders for the 1937 cars are being received and the full influx of this business in late August may create fresh delivery problems for the mills.

On the darker side of the picture is the greater realization of crop damage by drought, which has brought cancellation of farm machinery orders from stricken areas and a spirit of extreme caution to the farm equipment industry. Use of cans for corn and pea packs has been greatly curtailed, but tin plate mills have not suffered severely as the tin plate for these packs was ordered some time ago. Offsetting reduced consumption of tin plate for food cans is the good demand for general line cans and beer cans. The outlook for the wire industry is distinctly less encouraging because of impoverished farming areas.

PIG iron output in July totaled 2,594,268 gross tons, compared with 2,586,240 tons in June, or a daily rate last month of 83,686 tons from 86,208 tons in June, a loss of 2.9 per cent in the daily average. There was a gain of one active furnace on Aug. 1, when 146 were in blast against 145 on July 1. However, the daily rate of the 146 was only 83,720 tons compared with 85,405 tons for 145 on July 1. Ore shipments in July from upper Lake ports totaled 7,159,563 tons, a gain of 60.5 per cent over those of the same month last year.

THE IRON AGE composite steel scrap price has advanced to \$14.25 from \$13.67 a week ago and is the highest since Feb. 26, 1936, when it was \$14.75. There were advances of 75c. a ton at Pittsburgh, 50c. at Chicago and Philadelphia and \$1 at Youngstown, the latter not being included in the composite figure. In some districts a shortage of scrap is apparent.



...PITTSBURGH...

... Steel production maintains recent high rate.

o o o

... Delivery problems beset mills as buyers press for shipments.

o o o

... Heavy melting scrap advances 75c. a ton.

PITTSBURGH, Aug. 4.—Steel operations in the Pittsburgh district are up two points to 69 per cent of capacity, the highest rate attained since June, 1930. Wheeling operations are off two points to 94 per cent capacity.

General demand is holding up well on most finished steel items. However, mills are more interested in production and delivery problems than they are in new specifications. Backlogs in this district and the majority of the mills are sufficient to carry approximately the present rate of operations through the rest of this month. While new specifications for semi-finished steel and hot rolled bars during the past few days have eased off slightly, improvement has been noted in both strip and sheet bookings. Mills are booked solid for weeks to come on plate and shapes specifications as a result of heavy placement of orders for identified projects.

With the present heavy backlogs and the continuation of current rate of new specifications, it is becoming more apparent that the mills will find it exceedingly difficult to anywhere near satisfy delivery requirements when orders from automotive interests begin to appear in larger volume around the last of this month or the first of September.

Cold-finished bar business has been exceptionally good at the new prices, with July orders approximating 75 per cent of those received in June, which month was the highest since 1929.

Tin plate production remains at approximately 85 per cent, no drastic curtailment on the part of packers' specifications having taken place on account of the

drought. General line can business is holding up well.

Sheet specifications show marked improvement over the past week and some orders for 1937 automobile models have made their appearance.

Heavy melting scrap has risen 75c. and the market is extremely strong.

Pig Iron

Demand for pig iron continues on a hand-to-mouth basis with no outstanding activity. Steel foundries are still active, but jobbing foundry business remains at low ebb. The local merchant furnace is operating at practical capacity, with no signs of any immediate change in this rate.

Semi-Finished Steel

Demand for semi-finished material remains at recent levels. July bookings were below those of June owing mainly to some stocking on account of the price increase. However, the fact that demand is not extremely active at this time is not causing any worry to integrated mills, since they are hard put for all the semi-finished material they can get. In fact, heavy shipments of second-quarter priced material during July created a rather tight situation for steel mills whose bookings for finished material were such as to require most of their own output of semi-finished material.

Bars, Nuts and Rivets

Miscellaneous demand has shown no further recession over the past week and promises to hold at present levels. This type of business is normally dull at this time of year. However, good orders are being received daily from railroad

car builders and fabricators. July business in this district was about 70 per cent of that booked in June. Producers expect fair-sized tonnages from the automotive interests before the end of this month, and some small orders for material for 1937 models have already made their appearance. With the definite possibility of an increase in automotive business, coupled with a resumption of miscellaneous buying, there is every reason to believe that producers will see a good fall business.

Bars

Practically all tonnages taken at second quarter prices have cleared the mills. A much-better-than-expected July business has resulted in an exceptionally good backlog which will probably maintain present production during the rest of this month. Some producers are four to five weeks behind in shipments. This situation may become critical when automotive interests begin to specify freely. Since the mills are unable to give the quick service that was prevalent during the depth of the depression, consumers will either have to take the steel when they can get it or show a more liberal tendency toward specifying ahead. Meanwhile, demand over the past week has subsided a little, but this condition is thought to be temporary. Bookings from miscellaneous sources are holding up well, and, although implement makers have seasonally curtailed operations, nevertheless they are taking some tonnages. Considerable amounts of material are going into replacement and renovation of equipment which has been idle and unattended for three or four years.

Cold-Finished Bars

Aggregate bookings during July were approximately 75 per cent of those of June. This is an exceptional record when it is realized that orders placed in June topped any month since 1929. Practically all of the business placed in July was for miscellaneous sources with a few clean-up orders early in the month from automotive interests. Late last month the latter also placed some small tonnages for trial runs. Producers are anywhere from four to six weeks behind in delivery. With backlogs such as these, both producers and consumers are beginning to worry a little when it is realized that heavy automotive tonnages will probably be placed around Sept. 1. This market is definitely a sellers' market and prices are rigid to such an extent that the situation is reminiscent of pre-depression days. Aggregate demand, with the excep-

A Comparison of Prices

Market Prices at Date, and One Week, One Month, and One Year Previous;
Advances Over Past Week in Heavy Type, Declines in Italics

Rails and Semi-finished Steel

Per Gross Ton:	Aug. 4, 1936	July 28, 1936	July 7, 1936	Aug. 6, 1935
Rails, heavy, at mill.....	\$36.37 1/2	\$36.37 1/2	\$36.37 1/2	\$36.37 1/2
Light rails, Pittsburgh.....	35.00	35.00	35.00	35.00
Rerolling billets, Pittsburgh.....	30.00	30.00	30.00	27.00
Sheet bars, Pittsburgh.....	30.00	30.00	30.00	28.00
Slabs, Pittsburgh.....	30.00	30.00	30.00	27.00
Forging billets, Pittsburgh.....	37.00	37.00	37.00	32.00
Wire rods, Nos. 4 and 5, P'gh.....	38.00	38.00	38.00	38.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb....	1.80	1.80	1.80	1.70

Pig Iron

Per Gross Ton:	Aug. 4, 1936	July 28, 1936	July 7, 1936	Aug. 6, 1935
No. 2 fdy., Philadelphia.....	\$21.3132	\$21.3132	\$21.3132	\$20.3132
No. 2, Valley furnace.....	19.50	19.50	19.50	18.50
No. 2, Southern Cin'ti.....	20.2007	20.2007	20.2007	19.2007
No. 2, Birmingham.....	15.50	15.50	15.50	14.50
No. 2, foundry, Chicago*.....	19.50	19.50	19.50	18.50
Basic, del'd eastern Pa.....	20.8132	20.8132	20.8132	19.8132
Basic, Valley furnace.....	19.00	19.00	19.00	18.00
Malleable, Chicago*.....	19.50	19.50	19.50	18.50
Malleable, Valley.....	19.50	19.50	19.50	18.50
L. S. charcoal, Chicago.....	25.2528	25.2528	25.2528	24.2528
Ferromanganese, seab'd carlots.....	75.00	75.00	75.00	85.00

†This quotation is for delivery in South; in the North prices are 38c. a ton under delivery quotations from nearest Northern furnace.
*The switching charge for delivery to foundries in the Chicago district is 60c. per ton.

Scrap

Per Gross Ton:				
Heavy melting steel, P'gh....	\$15.50	\$14.75	\$13.75	\$12.75
Heavy melting steel, Phila....	13.00	12.50	12.25	11.00
Heavy melting steel, Ch'go....	14.25	13.75	13.25	11.75
Carwheels, Chicago.....	15.00	14.00	13.50	12.25
Carwheels, Philadelphia.....	14.75	14.25	13.75	11.25
No. 1 cast, Pittsburgh.....	14.75	14.75	14.75	13.50
No. 1 cast, Philadelphia.....	15.00	14.25	14.25	11.25
No. 1 cast, Ch'go (net ton)....	13.00	12.50	12.00	10.50
No. 1 RR. wrot., Phila.....	14.75	14.75	14.75	10.25
No. 1 RR. wrot., Ch'go (net)....	13.00	12.50	11.50	9.50

Coke, Connellsville

Per Net Ton at Oven:				
Furnace coke, prompt.....	\$3.50	\$3.50	\$3.50	\$3.40
Foundry coke, prompt.....	4.00	4.00	4.00	4.00

Metals

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Electrolytic copper, Conn....	9.75	9.75	9.50	7.75
Lake copper, New York.....	9.87 1/2	9.87 1/2	9.62 1/2	8.12 1/2
Tin (Straits), New York.....	43.00	42.00	42.37 1/2	52.50
Zinc, East St. Louis.....	4.80	4.80	4.75	4.50
Zinc, New York.....	5.17 1/2	5.17 1/2	5.12 1/2	4.87 1/2
Lead, St. Louis.....	4.45	4.45	4.45	4.05
Lead, New York.....	4.60	4.60	4.60	4.20
Antimony (Asiatic), N. Y....	13.00	13.00	13.00	12.75

Finished Steel

Per Lb.:	Cents	Cents	Cents	Cents
Bars, Pittsburgh.....	1.95	1.95	1.95	1.80
Bars, Chicago.....	2.00	2.00	2.00	1.85
Bars, Cleveland.....	2.00	2.00	2.00	1.85
Bars, New York.....	2.30	2.30	2.30	2.15
Plates, Pittsburgh.....	1.90	1.90	1.90	1.80
Plates, Chicago.....	1.95	1.95	1.95	1.85
Plates, New York.....	2.19	2.19	2.19	2.09
Structural shapes, Pittsburgh.....	1.90	1.90	1.90	1.80
Structural shapes, Chicago....	1.95	1.95	1.95	1.85
Structural shapes, New York.....	2.16 1/4	2.16 1/4	2.16 1/4	2.06 1/4
Cold-finished bars, Pittsburgh.....	2.25	2.25	2.25	1.95
Hot-rolled strip, Pittsburgh.....	1.95	1.95	1.95	1.85
Cold-rolled strips, Pittsburgh.....	2.60	2.60	2.60	2.60
Hot-rolled annealed sheets, No. 24, Pittsburgh.....	2.50	2.50	2.50	2.40
Hot-rolled annealed sheets, No. 24, Gary.....	2.60	2.60	2.60	2.50
Sheets, galv., No. 24, P'gh....	3.20	3.20	3.20	3.10
Sheets, galv., No. 24, Gary....	3.30	3.30	3.30	3.20
Hot-rolled sheets, No. 10, Pittsburgh.....	1.95	1.95	1.95	1.85
Hot-rolled sheets, No. 10, Gary.....	2.05	2.05	2.05	1.95
Cold-rolled sheets, No. 20, Pittsburgh.....	3.05	3.05	3.05	2.95
Cold-rolled sheets, No. 20, Gary.....	3.15	3.15	3.15	3.05
Wire nails, Pittsburgh.....	2.10	2.10	2.10	2.60
Wire nails, Chicago dist. mill.....	2.15	2.15	2.15	2.65
Plain wire, Pittsburgh.....	2.40	2.40	2.40	2.30
Plain wire, Chicago dist. mill.....	2.45	2.45	2.45	2.35
Barbed wire, galv., Pittsburgh.....	2.60	2.60	2.60	3.00
Barbed wire, galv., Chicago dist. mill.....	2.65	2.65	2.65	3.05
Tin plate, 100-lb. box, P'gh....	5.25	5.25	5.25	5.25

On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

The Iron Age Composite Prices

Finished Steel

Aug. 4, 1936	2.159c. a Lb.
One week ago	2.159c.
One month ago	2.159c.
One year ago	2.124c.

Based on steel bars, beams, tank plates, wire rails, black pipe, sheets and hot-rolled strips. These products represent 85 per cent of the United States output.

	HIGH	Low
1936.....	2.159c. July 7;	2.084c. Mar. 10
1935.....	2.130c. Oct. 1;	2.124c. Jan. 8
1934.....	2.199c. April 24;	2.008c. Jan. 2
1933.....	2.015c. Oct. 3;	1.867c. April 18
1932.....	1.977c. Oct. 4;	1.926c. Feb. 2
1931.....	2.037c. Jan. 13;	1.945c. Dec. 29
1930.....	2.273c. Jan. 7;	2.018c. Dec. 9
1929.....	2.317c. April 2;	2.273c. Oct. 29
1928.....	2.286c. Dec. 11;	2.217c. July 17
1927.....	2.402c. Jan. 4;	2.212c. Nov. 1

Pig Iron

\$18.84 a Gross Ton
18.84
18.84
17.84

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

HIGH	Low
\$18.84, Jan. 7;	\$18.84, Jan. 7
18.84, Nov. 5;	17.83, May 14
17.90, May 1;	16.90, Jan. 27
16.90, Dec. 5;	13.56, Jan. 3
14.81, Jan. 5;	13.56, Dec. 6
15.90, Jan. 6;	14.79, Dec. 15
18.21, Jan. 7;	15.90, Dec. 16
18.71, May 14;	18.21, Dec. 17
18.59, Nov. 27;	17.04, July 24
19.71, Jan. 4;	17.54, Nov. 1

Steel Scrap

\$14.25 a Gross Ton
13.67
13.08
11.83

Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

HIGH	Low
\$14.75, Feb. 26;	\$12.67, June 9
13.42, Dec. 10;	10.33, April 23
13.00, Mar. 13;	9.50, Sept. 25
12.25, Aug. 8;	6.75, Jan. 3
8.50, Jan. 12;	6.43, July 5
11.33, Jan. 6;	8.50, Dec. 29
15.00, Feb. 18;	11.25, Dec. 9
17.58, Jan. 29;	14.08, Dec. 3
16.50, Dec. 31;	13.08, July 2
15.25, Jan. 11;	13.08, Nov. 22

tion of automotive tonnages, remains at recent levels with no signs of abatement.

Steel Sheet Piling

A local independent has started production of part of the 6000-ton order going to Chicago for improvements at the mouth of the Chicago River. A few small jobs averaging 150 tons have been placed during the past week. Two or three large projects are pending and successful bidders will probably be announced soon.

Reinforcing Steel

Shipments continue extremely heavy. However, there is a tendency for new business to level off. Production problems have arisen which have put shipments anywhere from four to six weeks behind, this condition having been brought about by the extreme activity of the bar mills on merchant bar orders. The fact that all major producers have published prices seems to have had a strengthening effect on the price situation at market centers.

Shapes and Plates

The American Bridge Co. has received the award for 1270 tons of shapes for the Mississippi River lock No. 24 at Clarksville, Mo. It also was successful bidder on two state highway bridges at Fremont, Neb., involving 1200 tons. A feature of this week's structural inquiries is the appearance of quite a few fair-sized private projects. Meanwhile, miscellaneous demand for plates and shapes is holding at the recent level. The main problem during the next few months will be one of production, since local producers are booked well into September as a result of large placements for identified projects before the July 31 deadline for price protection.

Tin Plate

It is certain that can makers will be extremely cautious over the next month or so or until such time as an adequate picture of the extent of the crop damages can be obtained. Meanwhile, producers are receiving good specifications from general line can makers and there has been no let-up in bookings for beer plate. Total tonnages of terne plate going into quart oil cans has shown remarkable improvement this year over last year, and it is the combination of demand for this type of material and that of beer plate plus miscellaneous business that has resulted in such good tin plate production so far this year. There has been no evidence of any sharp curtailment of packers' specifications due to the drought. Pro-

ducers here are quite far behind on deliveries and recent hot weather has not helped operations any, which remain at approximately 85 per cent.

Tubular Products

There is evidence that July specifications for standard pipe will be equal to or possibly better than those of June, which was an exceptionally good month. Home building, home renovation and a host of industrial repairs have been responsible for the increasingly satisfactory rate of orders booked for standard pipe. Movement of industrial boiler tubes continues to hold up well. However, there is still no evidence of the railroads placing much business for railroad boiler tubes. Oil country business is showing remarkable strength and, although total tonnages placed during July were possibly a little less than in June, there is no evidence of any sharp leveling off in the near future.

Wire Products

Demand for merchant wire products has shown no disposition to fall off from recent levels. Although the drought will undoubtedly affect seriously some jobbers, nevertheless it has been spotty and business continues good in the unaffected areas. There are practically no stocks on hand and all material being shipped is going into actual consumption. Some jobbers, who early last month had ordered material in anticipation of labor disturbances which did not occur and are still a remote possibility, have found that normal consumption has cleaned up material ordered on this basis. There is evidence that the consuming market is extremely difficult to gage, and over-cautious sellers have frequently found themselves unable to supply consumers' orders because of lack of stock. Meanwhile, the movement of manufacturing wire shows no change over the last couple of weeks.

Sheets

Aggregate demand over the past week has shown good improvement with an increase in specifications for unclassified tonnage. A fair amount of material is being taken by drum and electrical equipment manufacturers. Quite a few orders involving fair-size tonnages are being placed by car roofing manufacturers. While as yet no large tonnages have been booked by automotive interests for the 1937 models, nevertheless a few orders have made their appearance, and producers expect specifications from this source in big volume by at least the first week of Septem-

ber. With the mills far behind on shipments, production difficulties are expected when an influx of automobile orders begins. Sheet mill operations remain at approximately 65 to 70 per cent.

Strip Steel

Demand over the past week is being maintained at recent levels. A few orders have been placed by parts makers for 1937 models, while a goodly proportion of the total tonnage is going to miscellaneous sources which have been the mainstay of this market over the past month. Adding machine, clock, cash register and furniture manufacturers have been in the market for material over the past week. Mills are still considerably behind on shipments of cold-rolled strip. All indications are that material purchased is going into immediate consumption.

Coal and Coke

Movement of coal to the Lakes continues at a high rate and it is not expected that there will be any let-up in these shipments during the rest of the season. Beehive coke producers continue to receive inquiries from practically all over the United States for domestic sizes. As pointed out before, some dealers are afraid of a shortage this fall and are stocking up at this time. Meanwhile producers of by-product coke are working at capacity.

Mesta and United Share Large Order

THE Mesta Machine Co., Homestead, Pa., has been awarded a contract for a five-stand tandem tin mill for installation in the Gary tin mill plant of the Carnegie-Illinois Steel Corp., at Gary, Ind. Mesta will also furnish feeding and winding equipment for the same mill. United Engineering & Foundry Co., Pittsburgh, will build four precision patented flying shears and two electrolytic strip cleaners and rewinders. United also received a contract for six uncoilers. The two companies are beginning production on the orders immediately and will complete the orders sometime before the end of the year.

Steel Founders' Society of America will move its offices from the Graybar Building, New York, to Room 920 Midland Building, Cleveland. The society expects to be established in the new location by Aug. 15.



CHICAGO

... *Ingot output up slightly.*

... *Pressure strong for deliveries of finished products.*

... *Scrap prices again advance; demand exceeding supply.*

CHICAGO, Aug. 4—Pressure for rolled steel products is moderately more severe and ingot production has climbed to a shade over 73 per cent of capacity, a gain of over one half point. Specifications remain above the average for the year and, as July came to a close, new buying of finished steel was ahead of shipments.

The bulge in sales is accounted for largely by the heavy tonnage products. Structural shapes are in excellent demand and plate shops are enjoying the best business of the year. Railroad car builders are specifying heavily and new commitments are of almost daily occurrence. Wire production is holding at 65 per cent of capacity, but sellers are concerned as to fall business, which they think will be handicapped by the drought. Shipments from sheet mills are still near capacity, but new buying is dragging and the margin between new sales and shipments is widening at a rapid rate. However, books are heavy, and near capacity output can be maintained throughout most of the current month.

Although this is normally a slow time for farm implement manufacturers, cancellations of orders by dealers have cut down production faster than it otherwise would have been reduced, and this is confusing the laying of plans for fall production.

Scrap prices are showing exceptional strength. Specialties are moving to consumers at prices that rise with each sale and steel mill grades are up 50c. a ton. These advances are not sufficient to release much scrap, and some dealers believe that a shortage exists.

Pig Iron

This market remains on an even keel, with the general foundry

business in excellent summer condition. Farm implement activity has declined sharply, but railroad needs are large. Automobile foundries are still awaiting word to push production on new models.

Cast Iron Pipe

Chicago has ordered 800 tons of 24-in. cast iron pipe. Other orders are all small but numerous and foundries are doing a good volume of business. WPA work is particularly active in Ohio and Michigan. A recent new development is that municipalities, both large and small, are occasionally entering the market for carlots. Special fittings will soon be ordered for a sewage disposal plant at Neenah, Wis.

Reinforcing Bars

New awards total 3000 tons, in which are included 1500 tons for two distillery buildings at Peoria, Ill., and 500 tons for a Federal housing project in Chicago. The 2500 tons needed for flow control at the mouth of the Chicago River will be placed in the very near future. Shops remain at capacity output and backlogs are heavy, but a lull is perceptible in new inquiries. The price situation is again giving concern. Not all sellers joined in the published quotation movement and dissatisfaction with conditions is growing among those who did accept the plan.

Sheets

Additional orders for 1937 automobile models have reached mills, which are looking for a real movement to start about the middle of the month. The general sheet business remains excellent and deliveries are not better than 30 days. New buying, as a whole, is declining, and in all probability will continue to do so until auto-

mobile plants step in on a broader scale. However, backlogs are large and mills can continue to produce near capacity for several weeks to come.

Rails

New business is confined to miscellaneous small lots and prospects for large tonnages are not bright. However, mills are scheduled through September, by which time some fall buying should develop. Hot weather has been retarding active track work and the drought may have a strong bearing on future purchases by railroads which traverse the dry areas.

Plates

Mills are well scheduled from a broader base of sources than has been the case for several years. Car builders are now specifying freely against car contracts taken in the last few months. Tank builders are enjoying their best business of the year and they are bidding on a substantial volume of new projects. The structural field is calling for large lots of plates and plate mills are freely shipping skelp for the manufacture of electrically welded pipe and well casing.

Structural Material

The 30-day protection period is now past and structural awards have fallen sharply. However, this condition is not expected to prevail for long on account of the large number of jobs which are known to be in the hands of architects and engineers. For instance, the state of Illinois has numerous overhead crossings, many of which came out as early as April and have not yet been acted upon. Bids went in today on dam No. 12 at Bellevue, Iowa, and others will follow throughout late summer and fall. A fabricator has taken 1500 tons for a private building at Streator, Ill., and a sugar refinery in California calls for 1000 tons. Fabricating shops are busy and order books are heavy.

Wire Products

Forward buying in country areas is very slow. Quite naturally the drought is looked upon as an explanation. However, sellers of wire products do not worry about the current period, which in normal years is quiet, but they are concerned about the fall, which they fear will also be dull. The manufacturing trade is moving fast and on a level. Heavy specifications from automobile manufacturers are expected late this month. Concrete mesh is moving freely to most sections of the

country. Production remains at 65 per cent of capacity.

Bars

Miscellaneous business remains at a high level and producers are awaiting word from 1937 automobile models for which both new buying and specifications are expected in a week to 10 days. Farm implement manufacturers have curtailed output sharply and are noncommittal as to their views of fall business. Bar deliveries range from three to four weeks and because of the character of specifications producers are counting 75 per cent of finishing capacity the best that they can do.



**... Awards of 9750 tons
—9445 tons in new
projects.**

AWARDS

New York, 250 tons, trusses for Queensboro bridge, to Truscon Steel Co.

New York, 280 tons, Treasury Department Procurement Division, to W. Ames & Co.

Jersey City, 150 tons, stadium, to Capitol Steel Corp.

Lancaster, Pa., 325 tons, high school, to Concrete Steel Co.

Nitro, W. Va., 360 tons, viscose building, to Concrete Steel Co.

Louisville, Ky., 500 tons, housing project, to Laclede Steel Co.

Memphis, Tenn., 300 tons, housing project, to Laclede Steel Co.

Chicago, 500 tons, Jane Addams housing project, to Bethlehem Steel Co.

Chicago, 280 tons, Pheoll Mfg. Co., to Concrete Engineering Co.

Chicago, 200 tons, Fleischmann Yeast Co., to Joseph T. Ryerson & Son.

Covington, Ind., 100 tons, court house, to Concrete Engineering Co.

State of Illinois, 100 tons, paving, to Concrete Engineering Co.

Peoria, Ill., 1500 tons, two buildings, for Hiram Walker, to Laclede Steel Co.

Beverly Hills, Cal., 150 tons, high school alterations, to Blue Diamond Corp.

Santa Ana, Cal., 100 tons, high school building, to Soule Steel Co.

Los Angeles, 100 tons, alterations on Breed Street school, to Truscon Steel Co.

Los Angeles, 100 tons, alterations on Belvedere junior high school, to Consolidated Steel Corp.

Los Angeles, 100 tons, alterations on First Street school, to Soule Steel Co.

Venice, Cal., 100 tons, high school building, to Patten Lumber Co.

Los Angeles, 100 tons, office building on North Ivar Street for Los Angeles Gas & Electric Co., to Blue Diamond Corp.

Los Angeles, 100 tons, projection room for Twentieth Century-Fox Film Corp., to Soule Steel Co.

Camarillo, Cal., 200 tons, units Nos. 10 and 11 at State hospital, to an unnamed bidder.

Van Nuys, Cal., 170 tons, plant for San Fernando Heights Lemon Co., to Blue Diamond Corp.

Van Nuys, Cal., 100 tons, auditorium at Sylvan Street school, to Soule Steel Co.

Brea, Cal., 140 tons, reconstruction of high school classroom and auditorium, to Consolidated Steel Corp.

Los Angeles, 460 tons, home economics building at Central high school, to Soule Steel Co.

Los Angeles, 160 tons, reconstruction of LeConte junior high school, to Blue Diamond Corp.

Colton, Cal., 329 tons, three State bridges, to Soule Steel Co.

Colton, 110 tons, cement silos, to Blue Diamond Corp.

Los Angeles, 414 tons for United States Treasury Department, Specification No. 13101, to Truscon Steel Co.

Los Angeles, 486 tons, for United States Treasury Department, Specifications Nos. 11086 and 12836, to Blue Diamond Corp.

Los Angeles, 312 tons, State bridge over Rio Hondo, Wash., to Blue Diamond Corp.

Los Angeles, 114 tons, Manchester Avenue school, to Blue Diamond Corp.

Los Angeles, 390 tons, for United States Treasury Department, Specification No. 10483, to Los Angeles Iron & Steel Co.

Los Angeles, 154 tons, Utah Street school, to Soule Steel Co.

Los Angeles, 137 tons, Arlington Avenue school, to Blue Diamond Corp.

Moscow, Idaho, 125 tons, dormitory at University of Idaho, to Bethlehem Steel Co.

Canal Zone, 250 tons, Specification No. 3162, to an unnamed bidder.

NEW REINFORCING BAR PROJECTS

Wallingford, Vt., 150 tons, State road.

Canton-Norwood-Westwood, Mass., 100 tons, State bridge.

Easton-Phillipsburg, Pa., 100 tons, bids in to Delaware River Joint Toll Bridge Commission.

Hill Creek, Philadelphia, 500 tons, rail steel bars for housing project; bids Aug. 11.

Camden, N. J., 500 tons, rail steel bars for housing project; bids Aug. 11.

State of New Jersey, 435 tons, route 6, bridge, to Maggi & Schoonover, Ridgewood, N. J.

State of New Jersey, 350 tons, route 23, highway work, to Lafera-Grecco, Newark.

Newark, 200 tons, Pennsylvania Railroad work, to J. Rich Steers, Inc.

New York, 250 tons, Department of Sanitation garage.

New York, 210 tons, Ward's Island, Department of Sanitation work, to Cauldwell-Wingate Co.

New York, unstated tonnage, Coca-Cola warehouse.

Buffalo, 104 tons, project J, sewage disposal plant for Buffalo Sewer Authority.

Saverton, Mo., 550 tons, dam No. 22 in Mississippi River; bids Aug. 18.

Green River, Wyo., 120 tons, State underpass and approaches; bids opened.

Los Angeles, 4000 to 6000 tons, court house and post office; bids advanced to Sept. 15.

Sawtelle, Cal., 500 tons, Veterans' hospital; bids Sept. 1.

Los Angeles, 328 tons for United States Treasury Department; Blue Diamond Corp., low bidder.

Tucumcari, N. M., 1150 tons, Conchas dam for United States Engineers; bids about Sept. 10.

Los Angeles, 3515 tons bars and 3570 tons cylinder reinforcement, Upper Feeder on Colorado River aqueduct distribution system; American Concrete & Steel Pipe Co., low bidder.



RAILROAD BUYING

Union Pacific has ordered one steam turbine electric locomotive, consisting of two 2500-hp. self-contained units, from General Electric Co.

Santa Fe has ordered a nine-car train from Edward G. Budd Mfg. Co.

Lehigh & New England has asked Interstate Commerce Commission for authority to issue \$410,000 in 2 3/4 per cent equipment trust certificates, fund to be used for purchase of 250 100,000-lb. steel hopper cars from Bethlehem Steel Co.

Board of District Commissioners, District Building, Washington, asks bids until Aug. 14 for one Prairie type steam locomotive with tender.

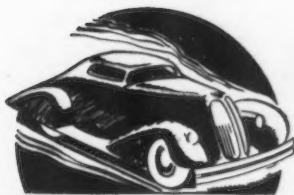
Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Aug. 11 for one steel rail bender, 13,600 steel railroad spikes, track bolts, guard rail clamps, bolted frogs, rigid switches, rails, shoulder tie plates, etc., for White Plains, N. Y. (Schedule 8523).

Ludlum Employees To Receive Bonus

FOLLOWING an improved second quarter statement and with prospects for increased future earnings bright, employees of the Ludlum Steel Co., Watervliet, N. Y., are to receive a bonus of 5 per cent on wages earned over the first half of the year, according to an announcement by H. G. Batcheller, president.

Although the company has adopted the Bedaux system, which is a plan for awarding additional compensation to workers by placing a valuation on results, not only in the quality of the product but also in the volume of tonnage produced, Mr. Batcheller said that it would take so long to work out details of this plan that workers would receive their extra compensation earlier in the form of a bonus to be added to their pay envelopes Aug. 14.

It was unofficially estimated that workers would receive an average amount of \$30.



... CLEVELAND ...

... Finishing mills continue to run at near capacity.

o o o

... Ingot output up at Cleveland, slightly lower at Youngstown.

o o o

... Scrap market exceedingly strong with \$1 advance at Youngstown.

CLEVELAND, Aug. 4.—Ingot output in the Cleveland-Lo-rain district advanced three points this week to 80 per cent of capacity, a small and a large open-hearth being put on during the week. Finishing mills continue to operate at near capacity. Ingot rate in the Youngstown area declined one point to 77 per cent of capacity.

Sustained mill operations throughout the summer plus new tonnages expected on 1937 model automobile runs this fall were reflected in a 60 per cent increase in iron ore shipments on the Great Lakes in July over the same month last year.

Pipe continues in good demand. It is expected that some steel will be placed for car repairs by the Chesapeake & Ohio in the early fall. The nickel plate's anticipated inquiry for 5000 tons of rails is not out yet.

Pig Iron

July shipments of pig iron from this area actually exceeded those of June, which was contrary to earlier expectations. July orders were light after June quarter buying and largely reflected an extension of contracts on which insufficient tonnage had been named. It is expected that much of this same type of buying will continue through August since foundry stocks in this area are said to be generally quite low. August shipments for this reason may be close to those of July. Buying of pig iron for the automotive industry is as yet an uncertain factor in the market.

Iron Ore

Ore shipments from upper Lake ports during July were 7,159,563

tons, an increase of 60.5 per cent over the 4,460,536 shipped during the same period last year. Total shipments for the 1936 season to Aug. 1 were 18,837,073 tons, an increase of 49.4 per cent over the corresponding 1935 season. This tremendous gain in July is indicative of sustained operations in blast furnaces inasmuch as the July figure is usually considered the peak for shipments in any year.

Bars, Plates and Shapes

Reinforcing bar awards are practically non-existent at the present time except for some very small projects, although some bridge work is expected before the end of the month. Fabricators failed to bid on three state of Ohio bridge jobs because the cost estimates were too low. It is expected that new bids will be called for before the end of the month, based on estimates in line with present-day costs. An award of 1080 tons on a new factory building for the Libbey-Owens-Ford Plate Glass Co. in Toledo was the highlight of the week in this area.

Local forge shops have orders out on bar stock for automotive parts, but few have issued any releases against them. Mills are being pressed for delivery on bars, now quoted at four to six weeks. There is still some tonnage of old-price material to be shipped, and it has been side-tracked largely as a result of pressing demands for new price material and the setback occasioned by the hot spell a few weeks back.

Sheets

Demand for sheets is surprisingly good. Although mill back-

logs are disappearing, bookings of new business are considered phenomenal for this season. The excess of shipments over orders is easing the delivery situation to some extent, but shipments still run up to six and seven weeks for specialties. Coated products particularly are in bad shape. Despite vacation shut-downs of two small electric motor plants, sales of silicon sheets and strip continue good. Automotive orders are again becoming a sustaining factor, with releases calling for shipment by Aug. 20 in some instances. Whereas refrigerator buying showed signs of falling off in late July, a resurgence of orders from this field is in evidence.

Strip Steel

Specifications on strip steel for 1937 model automobiles are beginning to come out in volume and releases against these orders should make August an even better month than July. The previous month, of course, suffered from June coverage at second quarter prices. Mills are still operating against good backlogs and are having difficulty in meeting deliveries within less than four weeks. Demand from stove and refrigerator makers is holding up surprisingly well.

Bolts, Nuts and Rivets

Bolt makers report that July turned out to be a much better month than anticipated, much better, in fact, than the volume of business placed in June. New orders for 1937 model requirements are coming through from the automotive industry in good volume, but no releases against them are expected for a few weeks. Rivet sales have been decidedly skimpy in recent weeks as the new price advances have come into effect. Bolt activity in this area has been reflected in wire purchases, which held up very well during July. Like the bolt makers, wire mills look to the automotive industry for the key to the upswing in early fall business.



... PIPE LINES ...

Winslow, Ind., plans steel pipe line for municipal gas distributing system. Fund of \$29,000 is being arranged through Federal aid.

Stanolind Pipe Line Co., Tulsa, Okla., plans welded steel pipe line from Bemis oil field, Ellis County, Kan., to connection with present main pipe line in Fairport district, Russell County, Kan., about 25 miles. for

crude oil transmission. Cost close to \$300,000. Company has let contract to Osage Construction Co., Tulsa, for new 6-in. Linde weld steel pipe line from point near Hutchinson, Kan., to connection with pipe line from western Kansas oil field, about 30 miles, for crude oil transmission. Cost over \$350,000.

Gulf Oil Refining Co., Port Arthur, Tex., has approved plans for reconditioning and improving 8-in. welded steel pipe line from El Dorado, Ark., to Dubberly, Webster County, La., about 60 miles, used for oil transmission, including replacements at different points. Company headquarters is in Gulf Building, Pittsburgh.

Southern Pipe Line Co., Tulsa, Okla., plans new 6-in. welded steel pipe line from oil field district at Frio, Neuces County, Tex., to Avery Point, near Corpus Christi, Tex., about 30 miles, for crude oil transmission. Cost over \$300,000. Neuces County Navigation District, Corpus Christi, will build bulk oil terminal at Avery Point, connecting with pipe line.

United Gas Public Service Co., Houston, Tex., a division of United Gas Corp., same place, has placed contract with Youngstown Sheet & Tube Co. for about 5000 tons of seamless and lap-welded pipe for extensions in natural gas transmission system.

Drillers Gas Co., Wichita, Kan., has awarded contract for a 4-in. Linde weld steel pipe line four miles long, near Russell, Kan., to Knupp Construction Co.



....BUFFALO....

... *Steel operating rate slightly lower.*

o o o

... *July pig iron shipments ahead of June.*

BUFFALO, Aug. 4.—The number of active open-hearth this week is less than last week, with Bethlehem's Lackawanna plant operating 22; Republic Steel Corp., 6 and Wickwire-Spencer Steel Corp., 1. It is understood that a second Wickwire furnace will be operated soon and Republic may put on an extra furnace.

Pig iron shipments during July were larger than during June. Most foundries are covered for the third quarter and last quarter booking will not go forward until Sept. 1. Current pig iron inquiries included one for 1000 tons and one for 500 tons, both foundry grade.

The Carborundum Co., Niagara Falls, has let a contract for an additional plant building to require 230 tons of structural steel which will be fabricated by a Buffalo concern. A Rochester concern will fabricate 110 tons of steel for an addition to the plant of the Heinz Co., food packer, in Medina, N. Y.



...CINCINNATI...

... *Sheet demand still at high level.*

o o o

... *Pig iron reacting to seasonal influences.*

CINCINNATI, Aug. 4.—Finished sheet demand continues to break precedent and normal trade anticipation. Bookings the past week were about 90 per cent of capacity output and consumers show little indication of curtailing. The automotive industry is steadily in the market, current requirements exceeding die try-out needs. Mill interests indicate that motor makers are placing themselves in position to proceed into production immediately upon completion of die tests. As a result, the normal easing of demand from this source has not materialized. In addition, general sheet demand from stove, refrigerator, office equipment and similar fields, is undiminished. Production is being maintained on an average of about 85 per cent. The leading interest reports full operations in all units, except the hot mill at Butler, Pa.

Pig iron, while above average, is reacting to seasonal influences. Shipments are slightly less than last month, while fresh ordering is just about 1000 tons a week. Foundry operations are slightly slower, the melt averaging around 60 per cent of full capacity. Automobile parts and stove melters are most affected by the tapering of demand.

Warehouse demand is on a level with June, as the building industry increases its requirements. New price schedules have been accepted.



...GREAT BRITAIN...

... *Steel mills disregard holidays to rush orders.*

LONDON, Aug. 4 (By Cable).—Demand for pig iron is steady and, as new business is quieter, requirements are more easily satisfied. Makers are sold heavily ahead and when buying is resumed after

the holidays a new shortage is probable.

The shortage in semi-finished steel has been partially relieved by consumers' holiday shutdowns. Most steel works are curtailing or disregarding the holidays altogether because of the large amount of work on hand and in prospect. Demand for structural steel is particularly heavy and some makers are seeking an extension of deliveries.

Orders have been placed for the sister ship of the Queen Mary, several large oil tankers and two battleships. The London North Eastern Railway Co. plans to spend £1,750,000 on rolling stock and other home railways have similar programs in mind. Large orders for rolling stock have also been received from abroad. Home demand for sheets is good and export prospects are improved by the recent international agreement.

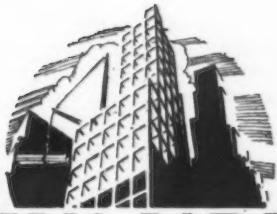
Strike in Barb Wire Plant Settled

THE strike of certain employees of the Northwestern Barb Wire Co., Sterling, Ill., who are affiliated with the Amalgamated Association of Iron, Steel & Tin Workers, has been settled by an agreement arrived at July 30 and announced by Robert Pilkenton, mediator for the Federal Labor Department. The strike was called three weeks ago.

The negotiations on the side of the strikers were conducted by Van A. Bittner, former West Virginian union coal miner organizer and now director in this area for John L. Lewis. The strikers unanimously ratified the settlement by vote.

The Northwestern company agreed to meet and deal with representatives of the local lodge No. 63 of the Amalgamated Association, who shall represent such of its employees as desire to be represented by them for the purpose of collective bargaining on wages, hours and working conditions. The company also will meet and deal with any other representatives of its employees or any individuals. The 10 per cent increase in wages was put into effect as of July 25, in order to bring the company's basic rate to 41c, which is in line with other wire mills in this district.

President P. W. Dillon said: "Our plan has been operating partially right along. We shall take back those employees who went out as rapidly as our mill orders require increased production."



...NEW YORK...

... *Steel sales holding up in fairly good volume.*

o o o

... *Tin plate consumption affected by small corn and pea crops.*

o o o

... *Reinforcing bar distributors operating under Robinson-Patman Act.*

NEW YORK, Aug. 4.—While some steel companies report a moderate falling off in the volume of new business, others are experiencing a demand in keeping with the average of July. Sheets are in particularly good demand, and virtually all mills are having difficulty in meeting delivery promises. Some of the sheet jobbers who bought quite liberally in June now regret that they did not order more heavily, as incoming material is being sent out of their warehouses almost as rapidly as it is received.

Steel sales offices have investigated to determine whether stocks in the hands of jobbers and consumers are being built up to any extent and have found that stocking of steel is extremely small as there is almost immediate use for all that is being shipped.

There are increasing intimations that purchases of cars and locomotives are being seriously considered by some of the Eastern railroads, but plans have not gone beyond the engineering departments as yet. In some instances, special financing will be required.

Effects of the drought on consumption of tin plate have now been more fully measured. Scarcely any section of the country except Maryland, Maine and the Pacific Coast escaped damage. In the Middle Western states, where the damage was most severe, packs of corn and peas have been greatly reduced, corn as much as 50 per cent in some areas and peas to a somewhat lesser extent. It is reliably esti-

mated that consumption of tin plate for corn and peas has been reduced at least 25 to 35 per cent in the country as a whole. Tomatoes have suffered less than corn and peas. In Maryland, for example, there will be bumper crops of tomatoes. While tin plate for beer cans will offset to some extent the losses caused by smaller packs of corn and peas, there will still be greater losses than were expected a few weeks ago. Beer cans will take less than 2,000,000 base boxes instead of the 3,000,000 boxes that has been predicted. The demand for tin plate for general line cans is exceptionally good and is helping to support the continued high rate of tin plate production.

With the exception of wire nails, the mill price situation remains very firm. The nominal price of wire nails is \$2.10 per 100-lb. keg, Pittsburgh, but sales have been made at \$1.90.

Pig Iron

While volume is not large, the market is benefiting from quite a run of scattered orders. Most sellers feel that this buying, which is based largely on prompt needs, will hold up well during the period ahead. Contracting for deferred third quarter delivery is not conspicuous, but a heavier trend may develop provided general business conditions continue as they are at present. Brooklyn foundries are again in operation, following settlement of the strike on July 31. The workers were granted a 5 per cent wage increase, with the un-

derstanding that an additional 5 per cent would be forthcoming in six months. Territories contingent to the New York area, particularly in the Massachusetts sector, report a shortage of molders. In the same area foundries making stoves are unusually busy, with orders piling up irrespective of the early season.

Reinforcing Bars

In the absence of an official Government interpretation of the Robinson-Patman price discrimination act, the leading concrete bar distributors of this area have taken the position, presumably upon legal advice, that to sell one contractor at a lower price than another, subject, of course, to establish quantity differentials, might constitute a violation of the law; hence, practically all of the distributors have published their own resale prices, resulting in a degree of price stability that the market has not known in years. Those who have not published their resale prices may have difficulty in buying bars from the mills, as the steel companies have likewise taken the position that they would lay themselves open to a charge of violating the law were they to supply material to a fabricator whose price policy was in open contravention of the law. It is still a little early, however, to say definitely just how the new plan is being received and to forecast how it will affect the price situation. All concerned are watching developments closely and some already are of the opinion that it will not accomplish the aims for which it is intended, since there are so many loopholes by which lowering of prices may be justified.



...ST. LOUIS...

... *Steel business still at good rate.*

... *Drought having some effect on buying.*

ST. LOUIS, Aug. 4.—Business in finished iron and steel continues at a fairly good rate, the greatest activity being in structural shapes, due to coverage by fabricators to anticipate the third quarter price advance, of which protections expired July 31. The

drought has had the effect of stimulating a strong demand for bale ties, so that farmers may lay by fodder of all kinds. On the other hand, the drought has curtailed the movement from distributors of fencing and wire products and roofing for repair work, which is being put aside.

Bids will be opened Aug. 18 for a dam at Saverton, Mo., requiring 3000 tons of sheet piling, 2500 tons of structural shapes and 550 tons of reinforcing bars. Stupp Brothers Bridge & Iron Co. has been awarded 160 tons of structural steel for repairs on a bridge over the Wabash tracks here. Reinforcing bars for two housing projects—500 tons at Louisville and 300 tons at Memphis—have been awarded to Laclede Steel Co.

A slight decline in the melt of pig iron in the St. Louis territory is noted. The implement business is off some owing to a seasonal decline, combined with a feeling of caution by manufacturers on account of the drought's possible effect on the demand for their products. The tractor business, however, continues at peak production. Cooler weather in St. Louis has been of help to production. Shipments in July were on about the same level as June.

One open-hearth furnace is down for repairs, cutting district operations to 66 per cent.



... Heavy scrap purchase in New England.

o o o

... Pig iron buying has not improved.

BOSTON, Aug. 4.—Pig iron buying has not improved, current sales being very largely in carlots for prompt or nearby delivery. The statistical position of iron is healthy as stocks, with a very few exceptions, are not excessive. With a continuation of the present melt, a considerable tonnage will be purchased for the last quarter.

The purchase of 10,000 to 15,000 tons of scrap by the American Steel & Wire Co., Worcester, Mass., indicates sustained activity at

the plant for some months. The New England plants of General Electric Co. and Westinghouse Electric & Mfg. Co. are very active, with no indication of any letdown. A pickup in demand for all kinds of machinery is anticipated by manufacturers. With some reduction in the number of active New England cotton spindles, as compared with a year ago, the industry is better employed than in several years. Unemployment and the number on welfare lists are decreasing in New England.



... Steel market flooded with new business.

o o o

... Operations unchanged.

BIRMINGHAM, Aug. 4.—The market for bars, plates and shapes is exceedingly active and has been so for the past month. Backed-up requirements have been released and are now flooding the markets. Mills cannot keep pace with orders and sizable backlogs are on hand. Buying of wire products and sheets has held at a steady rate and before the end of the month should begin to climb upward as the fall market in the farm section opens up. At the present time the steel situation in this district is unusually bright.

On the other hand, the pig iron market is sluggish. Current buying is largely on a spot basis. July shipments were slightly better than those of June. The base price remains at \$15.50.

The Ensley rail mill of the Tennessee Coal, Iron & Railroad Co. will reopen this month for a few days run, probably during the week of Aug. 24. At the present time, the schedule is for a run of from 1000 to 1500 tons. Frisco Railroad has lately bought 500 tons. The Seaboard Air Line is in the market for 6280 tons of 100-lb. rail, 600,000 tie plates and 19,300 kegs of track spikes.

Anniston Soil Pipe Co., Anniston, Ala., resumed operations last week after a shutdown of several years. Birmingham Ornamental Iron Co. has awarded contract for a new plant.

Blast furnace and open-hearth operations were unchanged last

week and no change is scheduled this week. Ten blast furnaces and 13 open-hearths are in production.



... Activity continues at a good pace.

o o o

... Construction work calls for large tonnages.

SAN FRANCISCO, Aug. 3.—Southern California, with Los Angeles in the fore, continues to hold the spotlight of Pacific Coast activity. The date for opening bids on the 16-story Federal building, Los Angeles, estimated to cost \$6,250,000 has been advanced to Sept. 15. This combined courthouse and post office will require approximately 20,000 tons of structural steel and 5000 tons of reinforcing bars. The Los Angeles Department of Water and Power opens bids today on 3572 tons of cast iron pipe.

American Concrete & Steel Pipe Co. is low bidder at Los Angeles on the Upper Feeder of the Colorado River aqueduct distribution system, in which 3570 tons of steel cylinder reinforcement and 3515 tons of reinforcing bars are included in the pre-cast alternates. Western Pipe & Steel Co. is low bidder on 3500 tons of plates in the steel pipe alternate. The general contract on the Federal jail at San Pedro, involving approximately 1000 tons of bars, has not yet been placed.

Of a total of 4526 tons of reinforcing bars placed in southern California, 1915 tons was for school construction and the United States Treasury Department purchased 1290 tons. Blue Diamond Corp. took 1739 tons, 1343 tons went to Soule Steel Co., while Truscon Steel Co. accounted for 514 tons. Consolidated Steel Corp. booked 450 tons of plates for the Metropolitan Water District, the only sizable plate letting of the week. Several placements of major tonnages are expected in the San Francisco area shortly.

The midsummer slack is only slightly noticeable and has been more than offset in the southern district by school construction. Industrial production continues to show favorable gains and is in a large degree responsible for the high rate of mill operations and warehouse sales.



... PHILADELPHIA ...

... *Average district operations up two points to 55 per cent.*

o o o

... *New bookings easing off fractionally.*

o o o

... *Shapes and reinforcing bars continue to lag.*

PHILADELPHIA, Aug. 4. — The inflow of new business has recently shown some tendency to ease off fractionally. Most sellers look for additional moderate declines, although all mills anticipate enough ordering to maintain their rolling backlogs at a comfortable level through August and into September. By that time, the normal fall increase in miscellaneous business will probably prevent any serious decline in operating activity.

Most mill representatives here are having difficulty in keeping their customers satisfied with deliveries. The new policy of giving workers vacations with pay has also been a definite factor contributing to delay in shipments.

Several district producers have added more open hearths, and the average rate for eastern Pennsylvania has advanced two points to 55 per cent. This is the highest level for 1936, and compares with a rate of 28 per cent for early August, 1935, and 22 per cent for the same period in 1934.

Wire nail quotations are fluctuating considerably, and base prices of 1.90c. or lower have been reported. Manufacturers' wire, however, is very firm, and in most instances the question of delivery is more important than price. Mills are generally eight weeks behind in shipments.

Pig Iron

New orders continue to come in at a steady pace, and indications are that total August tonnage will probably equal that for July, which in turn was about on a par with June bookings. Buyers are

showing no indication of changing their policy of confining orders to small lots for nearby delivery. All prices are very firm. There was a surge in Philadelphia imports during June. For the whole country, June iron imports totaled 16,793, which raised the six-month total to 97,507 tons. Only 53,486 tons came in during the same period last year.

Reinforcing Bars

Little attractive business has appeared during the past three

weeks on which prices could be tested. Nevertheless, market opinion is that distributors' resale quotations are nominally much steadier than has been the rule; for both mills and distributors are avoiding price discrimination in anticipation of any Government interpretation and enforcement of the Robinson-Patman act. Sellers of bars are still discouraged by the poor influx of new construction business. Bookings for the most part are confined to small lots; the only large active tonnages consist of 500 tons each for two local housing projects.

Plates and Shapes

Local plate mills are at least three weeks behind on deliveries. Prices are firm. Latterly there has been a tendency for new bookings to fall off slightly, but sellers consider this decline as normal and even look for further moderate recessions in backlogs. Only a few identified-project orders were placed just before the deadline late last week. Considerable ship tonnage is still pending here, and the Pennsylvania Railroad is considering an increase in its car repair program. The structural shapes market is very quiet. The only large active project is a bridge at Easton, Pa., involving 4500 tons, and three new highway bridges, which will require about

Working Metals With Wood!

Sounds fantastic, but that's essentially what drop forgers do when they operate drop hammers. And what a tough job this is to expect of a piece of wood.

Obviously, just any kind of hammer board won't do. Keen discrimination is needed, and here the H. G. Irwin Lumber Co. can help you make the most satisfactory selection.



We recommend "Durock" Hammer Boards which are made of durable rock maple, carefully selected for exceptional toughness and straight grain. They have been patiently air-dried and scientifically cut for hammer service.

Try "Durock" Hammer Boards and see how they can "take it."

We furnish "Silveroc" hammer boards also made from Pennsylvania Rock Maple.

H.G. IRWIN
LUMBER CO.
ERIE, PA.
DUROCK

600 tons, which came up for bidding during the week. About 700 tons of shapes was awarded during the past seven days.

Sheets

Pittsburgh mills are eight weeks behind in deliveries for certain grades of sheets, and district producers usually ask for three to four weeks' time on new orders for blue-annealed and hot-rolled grades. New bookings have shown a tendency to ease off during the past few days, but sellers look for no serious decline during August. Some auto body business has been placed, but a sizable tonnage for fall models is yet to be ordered. Practically all second quarter orders have cleared the mills although a few lots are still being delayed. Apollo Steel Co. secured 250 tons of license tag stock from the State of Pennsylvania. Published price levels were fully upheld in the bids for this tonnage.

Imports

The following iron and steel imports were received here last week: 2000 tons of chrome ore from Portuguese Africa; 8373 tons of chrome ore from French Oceania; 202 tons of sponge iron, 8 tons of charcoal bar iron, 76 tons of steel tubes, 61 tons of CDS wire, 18 tons of steel forgings and 32 tons of steel bars from Sweden.



CAST IRON PIPE..

Rome, N. Y., plans early purchase of pipe for extensions and replacements in water system.

Jackson, N. C., plans pipe lines for water system. Financing has been arranged for this and pumping station installation.

Greensboro, N. C., is considering new 30-in. line for main water supply from municipal pumping station at Reedy Fork, connecting with present system in uptown zone area.

Randolph, N. C., plans pipe lines for joint water system with Guilford, a neighboring community. Fund of \$170,000 is being arranged for this and other waterworks installation, and sewerage lines.

Bartlett, Tenn., is arranging bond issue of \$15,000 for water pipe lines and other waterworks installation.

Mountain Home, Ark., plans pipe lines for water system and other waterworks installation. Fund of \$33,000 has been secured through Federal aid. R. E. Williams, Little Rock, Ark., is consulting engineer.

Shreveport, La., plans pipe lines for extensions and replacements in water system. Fund of \$117,000 will be arranged for this and other waterworks installation. T. L. Amiss, Shreveport, is engineer.

Corning, Ohio, plans pipe lines for water system. Fund of \$78,000 is being arranged for this and other waterworks installation.

of which \$25,000 bond issue will be voted on at special election Aug. 18, and remainder of appropriation secured through Federal financing.

Chicago has awarded 800 tons of 24-in. to Glamorgan Pipe & Foundry Co.

Madison, Wis., contemplates application for PWA funds for new feeder mains, new well, etc., to cost about \$100,000. Leon A. Smith is superintendent of water department.

Black River Falls, Wis., has engaged Mead, Ward & Hunt, consulting engineers, Madison, Wis., to design water treatment plant.

Pipestone, Minn., closes bids Aug. 10 for 4000 ft. of 4 and 8-in., with 2000 lb. of cast iron fittings, valves, etc. T. A. Bailey is city clerk.

Fargo, N. D., will take bids soon for 8-in. pipe for main trunk line for water supply in new district in Eleventh Street. W. P. Tarbell is city engineer.

Britton, S. D., has authorized pipe lines for water system and other waterworks installation. Bond issue has been voted. Arthur Mannes, Aberdeen, S. D., is consulting engineer.

St. Marys, Mo., is arranging bond issue of \$30,000 for water pipe lines and other waterworks installation. Russell & Axon, 4903 Delmar Boulevard, St. Louis, are consulting engineers.

Longford, Kan., plans pipe lines for water system and other waterworks installation, including elevated steel tank. Financing has been arranged through Federal aid. Paulette & Wilson, Farmers' Union Building, Salina, Kan., are consulting engineers.

Ignacio, Colo., plans pipe lines for water system and other waterworks installation, also sewer system. Bond issue is being arranged.

Santa Cruz, Cal., plans about 1825 ft. of 10-in. for replacing present 4-in. line in part of Mission Street. E. E. Evans, city clerk, will ask bids soon.

Los Angeles Department of Water and Power opened bids Aug. 3 on 3572 tons of 6 and 8-in.

Seattle has taken bids on 180 tons for Rainier Avenue extension project.

Stockton, Cal., has purchased 150 tons of 8-in. in the open market.

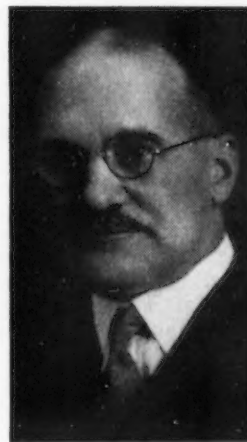
Safety Meeting in Cleveland Aug. 12

FIRST of a series of state-wide safety meetings will be held in Cleveland under auspices of the Society of Ohio Safety Engineers on Aug. 12 at the Cleveland Hotel. More than 200 safety heads of Ohio corporations are expected to attend the meeting, which will be featured with a paper on recent developments in the use of common salt in preventing heat cramps, by Dr. P. H. Kennedy, medical advisor of the Youngstown Sheet & Tube Co. Dr. R. A. Engel, head of the medical department of Corrigan-McKinney plant, Republic Steel Corp., will lead discussion. The committee in charge of arrangements is headed by R. H. Ferguson, manager of safety, Republic Steel Corp. The society president is A. C. Cook, director of safety, Carnegie Illinois Steel Corp., Youngstown.



...OBITUARY...

L. R. CUSTER, general manager of the Cambria plant of the Bethlehem Steel Co., Johnstown, Pa., died of a heart attack at his home near Johnstown on July 31, aged 63 years. After spending some years in the Altoona shops of the Pennsylvania Railroad, he entered



L. R. CUSTER

the steel industry at the Homestead plant of the old Cambria Steel Co. Later he went to the Midvale Steel & Ordnance Co. as development engineer and in 1919 returned as vice-president to the Cambria Steel Co., then a Midvale subsidiary. Following Bethlehem's acquisition of the Cambria Steel Co. in 1923, Mr. Custer became general manager. He was a member of the American Iron and Steel Institute and took a leading part in reconstruction work at Johnstown following the floods early this year.

❖ ❖ ❖
ROBERT S. MURRAY, former treasurer of the General Electric Co., Schenectady, N. Y., died at his home in that city on July 29, aged 68 years. He had been in poor health for about a year and retired from his position on May 1.

❖ ❖ ❖
CECIL L. FERGUSON, superintendent, Mahoning Valley Steel Co., Niles, Ohio, died July 27 after a brief illness, aged 53 years. He was employed for several years by the Mansfield Sheet & Tin Plate Co., and later was superintendent of one of the Niles plants of the Empire Steel Corp. He had been superintendent of the Mahoning Valley plant about seven years.



...NON-FERROUS...

... July tin deliveries exceed 7000 tons.

... Good undertone in lead and zinc.

NEW YORK, Aug. 4.—Copper buying by the domestic industry has quieted, but demand from the export outlet keeps up, and prices range today from 9.45c. to 9.50c. a lb., c.i.f., European base ports. The home price is firm at 9.75c. a lb., Connecticut Valley. Yesterday, the first full trading period in the new month, not more than 428 tons was taken by domes-

tic users; however, in view of record July sales of 175,484 tons, it is not in the least surprising that demand should moderate. Sellers are uniformly optimistic over future prospects, and a strong probability exists that before very long, say by October at the latest, 10c. copper will make its appearance. The present turbulent political situation in Europe is undoubtedly re-

sponsible for a good measure of the buying by foreign interests.

Lead

With August requirements approximately 85 per cent covered, consumers are now largely buying for September delivery. The latter month is about 35 per cent sold. In certain directions, the week gives evidence of being another good one from the tonnage standpoint, but elsewhere sellers state that demand has naturally moderated to a degree where daily sales are proceeding at a more normal pace. While it is felt that July shipments exceeded 37,000 tons, for August a still larger volume is predicted. Recent buying movements have included practically all types of consumers, and diversification continues. The price for lead is firm and unchanged at 4.45c. a lb., St. Louis, and 4.60c., New York.

Zinc

Despite recent sizable commitments, users of zinc are still placing orders. Prime Western grade sold last week to the extent of 2717 tons, shipments amounted to 3447 tons and unshipped tonnage eased slightly to about 41,000 tons. The foreign quotation has netted additional small gains recently, and local sellers anticipate no immediate trouble from that direction. The domestic price continues firm at 4.80c. a lb., East St. Louis basis. Prices for the two grades of ore are \$30 and \$31, respectively.

Tin

American deliveries of tin in July were 7120 tons. The statistics turned out better than expected. The world's visible supply, including the Eastern and Arnheim carry-over, increased only 311 tons to 16,759 tons. In the past week trading has been very quiet, about the only activity noticeable being that in which the switching of commitments from spot to future positions has occurred. This has been prompted by consumer desire to take advantage of existing discount rates on forward positions. Internationally, the restriction issue with Siam remains unsettled. Prices, on the whole, are higher. The morning's London quotation on standard spot was £185 5s., while futures were £182 5s. The Eastern price was £185 7s. 6d. Today's price for Straits metal at New York is 43.00c. a lb.

Non-Ferrous Averages

	July aver.
Electrolytic copper, Conn. ...	9.596c. a lb.
Lake copper, Eastern delivery ...	9.721c. a lb.
Straits tin, spot, N. Y. ...	42.961c. a lb.
Zinc, East St. Louis ...	4.785c. a lb.
Zinc, New York ...	5.160c. a lb.
Lead, St. Louis ...	4.450c. a lb.
Lead, New York ...	4.600c. a lb.

The Week's Prices. Cents Per Pound for Early Delivery

	July 29	July 30	July 31	Aug. 1	Aug. 3	Aug. 4
Electrolytic copper, Conn.*....	9.75	9.75	9.75	9.75	9.75	9.75
Lake copper, N. Y.	9.87 1/2	9.87 1/2	9.87 1/2	9.87 1/2	9.87 1/2	9.87 1/2
Straits tin, Spot, New York....	43.00	42.87 1/2	42.75	43.00	43.00	43.00
Zinc, East St. Louis.....	4.80	4.80	4.80	4.80	4.80	4.80
Zinc, New York.....	5.17 1/2	5.17 1/2	5.17 1/2	5.17 1/2	5.17 1/2	5.17 1/2
Lead, St. Louis.....	4.45	4.45	4.45	4.45	4.45	4.45
Lead, New York.....	4.60	4.60	4.60	4.60	4.60	4.60

*Delivered Connecticut Valley; price 1/4 c. lower delivered in New York.

†Includes emergency freight charge.

Aluminum, virgin 99 per cent plus, 19.00c.-21.00c. a lb. delivered.
Aluminum, No. 12 remelt No. 2 standard, in carloads, 17.00c. lb., delivered.
Nickel, electrolytic, 35c. to 36c. a lb. base refinery, in lots of 2 tons or more.
Antimony, Asiatic, 13.00c. a lb., New York.
Quicksilver, \$74.00 to \$75.00 per flask of 76 lb.
Brass ingots, commercial 85-5-5-5, 9.25c. a lb., delivered; in Middle West 1/4 c. a lb. is added on orders for less than 40,000 lb.

From New York Warehouse

Delivered Prices, Base per Lb.

Tin, Straits pig.....	44.00c. to 45.00c.
Tin, bar	46.00c. to 47.00c.
Copper, Lake	10.75c. to 11.75c.
Copper, electrolytic.....	10.75c. to 11.75c.
Copper, castings	10.50c. to 11.50c.
*Copper sheets, hot-rolled	17.25c.
*High brass sheets.....	15.37 1/2 c.
*Seamless brass tubes	17.62 1/2 c.
*Seamless copper tubes	17.75c.
*Brass rods	13.37 1/2 c.
Zinc, slabs	5.75c. to 6.75c.
Zinc, sheets (No. 9), casks, 1200 lb. and over	10.25c.
Lead, American pig. 5.10c. to 6.10c.	
Lead, bar	6.10c. to 7.10c.
Lead, Sheets, cut.....	8.25c.
Antimony, Asiatic.....	14.00c. to 15.00c.
Alum., virgin, 99 per cent plus	23.30c.
Alum., No. 1 for remelting, 98 to 99 per cent	18.50c. to 20.00c.
Solder, 1/2 and 1/2	28.50c. to 29.50c.
Babbitt metal, commercial grades.....	25.00c. to 60.00c.

*These prices are also for delivery from Chicago and Cleveland warehouses.

From Cleveland Warehouse

Delivered Prices Per Lb.

Tin, Straits pig.....	45.00c.
Tin, bar	47.00c.

Copper, Lake	10.50c. to 10.75c.
Copper, electrolytic.....	10.50c. to 10.75c.
Copper, castings	10.25c. to 10.50c.
Zinc, slabs	6.50c. to 6.75c.
Lead, American pig. 5.20c. to 6.50c.	
Lead, bar	8.50c.
Antimony, Asiatic	15.00c.
Babbitt metal, medium grade.....	19.00c.
Babbitt metal, high grade.....	49.00c.
Solder, 1/2 and 1/2	24.50c.

Old Metals, Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators, and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal.)

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	7.50c.	8.25c.
Copper, hvy. and wire	7.37 1/2 c.	7.87 1/2 c.
Copper, light and bottoms	6.37 1/2 c.	6.87 1/2 c.
Brass, heavy	4.25c.	4.87 1/2 c.
Brass, light	3.50c.	4.25c.
Hvy. machine composition	6.25c.	6.75c.
No. 1 yel. brass turnings	5.25c.	5.75c.
No. 1 red brass or compos. turnings.....	5.87 1/2 c.	6.37 1/2 c.
Lead, heavy	3.62 1/2 c.	4.00c.
Sheet aluminum.....	13.25c.	14.75c.
Zinc	2.50c.	2.87 1/2 c.
Cast aluminum	12.12 1/2 c.	13.25c.



IRON AND STEEL SCRAP

... Composite again increases — now stands at \$14.25.

o o o

... Scrap preparation lags in all consuming centers.

o o o

... Consumer purchases expected soon; will clarify price status.

CONTINUED broker purchases at Pittsburgh, Chicago and Philadelphia have again forced the scrap composite up. The new \$14.25 level is the highest point reached since Feb. 26. Severe shortages existing at most important consuming points have made it necessary for brokers to pay increasingly higher prices to cover their short positions, while an increase in mill activity this week to 72 per cent and no immediate prospect of an early decrease in operations indicates that the rising trend of scrap prices is not yet at an end.

There has been little new export buying, for foreign mills are generally unwilling to meet the current \$14 to \$14.50 price level.

Pittsburgh

Within the past several days a few thousand tons of No. 1 steel has been purchased at \$15.75, thus forcing the market up 75c. over last week's level. Other open-hearth grades have risen in sympathy. It is doubtful whether any large tonnage of steel could be purchased at present price levels since many dealers are refusing to sell even at \$16. At the present time some brokers are paying \$15.50 to cover old orders. One large consumer is temporarily out of the market; however, dealers welcome this opportunity in order to straighten out their own affairs since the rapid increase in the price of scrap has caused most of them to pay prices near previous selling figures. Meanwhile, the scrap market continues exceptionally strong and the next sales will probably bring higher prices.

Chicago

Prices are rising to new high levels and their current strength indicates that the top has not been reached. Mill buying of heavy melting steel is established at \$14.50, delivered, and some

specialties are up \$1 a ton, with supplies still limited below the ability and willingness of consumers to absorb them. Many old orders are still to be filled, and buying prices are forcing brokers into the red on many old transactions.

Cleveland

The market is very strong and prices continue to advance. Some dealers have been caught in a short situation and are having difficulty in filling orders at any price owing to the curtailment of scrap coming from plants serving the automotive industry, now entering its summer shut-down period. Price increases here range around 25c. a ton. The Youngstown district is particularly active, with No. 1 steel bringing \$15.00 or better. Hydraulic bundles also are in demand, and, like heavy melting steel, rose \$1 during the week.

Philadelphia

This dealer-inspired market continues to bound upward at an artificially rapid pace. Each day brokers are raising their offers slightly in order to obtain sufficient material to ship against old orders, and, also, to get in a sufficiently long position to hazard additional mill sales. There were no new mill purchases of important grades during the seven-day period ended today; nevertheless the potential demand is sizable, and definite action is entirely likely during the next week. No. 1 and No. 2 steels are nominally quoted at \$13 and \$12 respectively, but district mills would probably have to better these figures for any large tonnages. Standard Steel Works was successful bidder for the Budd Mfg. Co.'s 2200 tons of compressed bundles for August delivery, at a price well over \$12.50 f.o.b. About 500 tons of No. 1 and 500 tons of heavy cast on the same list went to a local broker at about \$13 and \$14 respectively. Blast furnace is now \$8 or better, as established by a recent sale, and brokers are finding machine shop turnings hard to obtain at \$9.

Boston

The purchase of scrap by the American Steel & Wire Co., Worcester, estimated at 10,000 to 15,000 tons, at prices ranging up to \$11.25 to \$12.25 a ton, delivered, for No. 1 steel, was the outstanding feature the past week. This price has not yet been met by exporters, but they probably will raise their bids at least 25c. a ton this week. Providence exporters can ship to Worcester to better advantage than to export, which may hold up loadings at Providence.

New York

An apparent scrap shortage is the most prominent market feature here. One large upstate consumer which normally buys through brokers to some extent is finding material so difficult to obtain that it is being forced to buy direct from small dealers. Some abnormally high prices are reported to have been paid by brokers to cover short positions, but published prices have not been changed. Export shipments continue on old orders. New business is quiet, as foreign mills are not inclined to meet current offers in this country.

Buffalo

Republic Steel Corp. has purchased between 5000 and 6000 tons of scrap, principally No. 2 steel at \$12.25. Bethlehem Steel Co. continues to offer \$13 for No. 1, but receipts are very small, and no single large tonnage has changed hands at this price. Steel wheels and axles are bringing \$16.50 at Erie.

St. Louis

The market generally is firm, with the only price changes in the list being advances of 25c. in dealers' buying prices for No. 2 steel and cast car wheels. There have been no mill sales of consequence. The 15-carload scrap offering by the St. Louis-Southwestern was taken by local dealers.

Cincinnati

Mill inquiry for old materials stimulated this market during the week. While buying is still limited to urgencies, dealers have moved to strengthen the market undertone. Bids on important items advanced 50c. to \$1 a ton, as dealers endeavor to get into long positions.

Detroit

A rise in activity that started out largely on the basis of speculative buying six weeks ago turned into a real market because of a 10,000-ton shipment of hydraulic bundles by water to Buffalo. This did not create a short situation, however, since all this tonnage was in sight and had been quietly accumulated over a period of seven or eight months. The mills seem to be taking all they can get at present prices, although there are relatively few offerings. What will happen when the supply is cut off when most automobile plants go down during the early part of August, no one yet knows. It is expected, however, that the continued rise of the past several weeks will be stabilized at its present high level.

Iron and Steel Scrap Prices

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	\$15.25 to \$15.75
No. 2 hvy. mltng. steel.	14.00 to 14.50
No. 2 R.R. wrought.	15.75
Scrap rails.	14.00 to 14.50
Rails, 3 ft. and under.	16.75 to 17.25
Comp. sheet steel.	15.25 to 15.75
Hand bundled sheets.	14.25 to 14.75
Hvy. steel axle turn.	13.75 to 14.75
Machine shop turn.	10.50 to 11.00
Short shov. turn.	10.50 to 11.00
Mixed bor. & turn.	10.00 to 10.50
Cast iron borings.	10.00 to 10.50
Cast iron carwheels.	14.25 to 14.75
Hvy. breakable cast.	12.75 to 13.25
No. 1 cast.	15.50 to 16.00
RR. knuckles & cplrs.	18.00 to 18.50
Rail coil & leaf springs.	18.00 to 18.50
Rolled steel wheels.	18.00 to 18.50
Low phos. billet crops.	18.00 to 18.50
Low phos. sh. bar.	17.25 to 17.75
Low phos. punchings.	17.00 to 17.50
Low phos. plate scrap.	16.75 to 17.25
Steel car axles.	15.50 to 16.00

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	\$13.50 to \$14.00
No. 2 hvy. mltng. steel.	12.50 to 13.00
Comp. sheet steel.	13.00 to 13.50
Light bund. stampings.	9.00 to 9.50
Drop forge flashings.	12.50 to 13.00
Machine shop turn.	8.50 to 9.00
Short shov. turn.	8.75 to 9.25
No. 1 busheling.	12.50 to 13.00
Steel axle turnings.	9.50 to 10.00
Low phos. billet crops.	17.00 to 17.50
Cast iron borings.	8.75 to 9.25
Mixed bor. & turn.	8.75 to 9.25
No. 2 busheling.	8.75 to 9.25
No. 1 cast.	14.50 to 15.00
Railroad grate bars.	8.00 to 8.50
Stove plate.	9.00 to 9.50
Rails under 3 ft.	16.00 to 16.50
Rails for rolling.	16.50 to 17.00
Railroad malleable.	17.00 to 17.50
Cast iron carwheels.	15.50

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	\$13.00
No. 2 hvy. mltng. steel.	12.00
Hydraulic bund., new.	13.00
Hydraulic bund., old.	11.00
Steel rails for rolling.	\$15.50 to 16.00
Cast iron carwheels.	14.50 to 15.00
Hvy. breakable cast.	14.00 to 14.50
No. 1 cast.	14.75 to 15.25
Stove plate (steel wks.)	11.00
Railroad malleable.	16.50
Machine shop turn.	8.50 to 9.00
No. 1 blast furnace.	8.00
Cast borings.	8.00
Heavy axle turnings.	11.50
No. 1 low phos. hvy.	16.50 to 17.00
Couplers & knuckles.	16.50 to 17.00
Rolled steel wheels.	16.50 to 17.00
Steel axles.	17.00 to 17.50
Shafting.	19.00 to 19.50
No. 1 R.R. wrought.	14.50 to 15.00
Spec. iron & steel pipe.	12.50
Bundled sheets.	11.50 to 12.00
No. 1 forge fire.	12.00 to 12.50
Cast borings (chem.).	10.50 to 13.00

CHICAGO

Delivered to Chicago district consumers:

Per Gross Ton	
Hvy. mltng. steel.	\$14.00 to \$14.50
Auto, hvy. mltng. steel.	12.00 to 12.50
Shoveling steel.	14.00 to 14.50
Hydraul. comp. sheets.	13.00 to 13.50
Drop forge flashings.	12.50 to 13.00
No. 1 busheling.	13.00 to 13.50
Rolled carwheels.	16.00 to 16.50
Railroad tires cut.	16.00 to 16.50
Railroad leaf springs.	16.00 to 16.50
Axle turnings.	13.50 to 14.00
Steel coup. & knuckles.	16.50 to 17.00
Coil springs.	17.00 to 17.50
Axle turn. (elec.).	14.25 to 14.75
Low phos. punchings.	16.50 to 17.00
Low phos. plates, 12 in. and under.	17.00 to 17.50
Cast iron borings.	7.00 to 7.50
Short shov. turnings.	7.25 to 7.75
Machine shop turn.	6.00 to 6.50
Rerolling rails.	15.00 to 16.00
Steel rails under 3 ft.	16.25 to 16.75
Steel rails under 2 ft.	17.00 to 17.50
Angle bars, steel.	16.00 to 16.50
Cast iron carwheels.	15.00 to 15.50
Railroad malleable.	16.50 to 17.00
Agric. malleable.	14.00 to 14.50

Per Net Ton

Iron car axles.	\$17.50 to \$18.00
Steel car axles.	17.00 to 17.50
No. 1 R.R. wrought.	13.00 to 13.50
No. 2 R.R. wrought.	12.50 to 13.00

No. 2 busheling, old.	\$6.00 to \$6.50
Locomotive tires.	12.50 to 13.00
Pipes and flues.	8.50 to 9.00
No. 1 machinery cast.	13.00 to 13.50
Clean auto. cast.	12.00 to 12.50
No. 1 railroad cast.	12.00 to 12.50
No. 1 agric. cast.	10.50 to 11.00
Stove plate.	8.00 to 8.50
Grate bars.	9.00 to 9.50
Brake shoes.	9.50 to 10.00

BUFFALO

Per gross ton, f.o.b. consumers' plants:

No. 1 hvy. mltng. steel.	\$13.00 to \$13.50
No. 2 hvy. mltng. steel.	11.50 to 12.25
Scrap rails.	12.00 to 12.50
New hvy. b'ndled sheets.	11.50 to 12.00
Old hydraulic bundles.	10.50 to 11.00
Drop forge flashings.	11.50 to 12.00
No. 1 busheling.	11.50 to 12.25
Hvy. axle turnings.	10.50 to 11.00
Machine shop turn.	6.00 to 6.50
Knuckles & couplers.	15.00 to 15.50
Coil & leaf springs.	15.00 to 15.50
Rolled steel wheels.	15.00 to 15.50
Low phos. billet crops.	15.50 to 16.00
Short shov. turnings.	9.00 to 9.50
Mixed bor. & turn.	8.00 to 8.50
Cast iron borings.	8.00 to 8.50
No. 2 bushelings.	6.50
Steel car axles.	14.50 to 15.00
Iron axles.	12.00 to 12.50
No. 1 machinery cast.	13.50 to 14.00
No. 1 cupola cast.	13.00 to 13.50
Stove plate.	10.50 to 11.00
Steel rails under 3 ft.	15.75 to 16.25
Cast iron carwheels.	11.50 to 12.00
Railroad malleable.	15.00 to 15.50
Chemical borings.	9.00 to 9.50

BIRMINGHAM

Per gross ton delivered to consumer:

Hvy. melting steel.	\$11.00 to \$11.50
Scrap steel rails.	11.50 to 12.00
Short shov. turnings.	7.00
Stove plates.	8.00
Steel axles.	12.00 to 12.50
Iron axles.	12.00 to 12.50
No. 1 R.R. wrought.	8.50 to 9.00
Rails for rolling.	12.50 to 13.00
No. 1 cast.	12.00 to 12.50
Tramcar wheels.	11.00 to 12.00

ST. LOUIS

Dealers' buying prices per gross ton delivered to consumer:

Selected hvy. steel.	\$12.75 to \$13.25
No. 1 hvy. melting.	12.25 to 12.75
No. 2 hvy. melting.	10.25 to 10.75
No. 1 locomotive tires.	12.00 to 12.50
Misc. stand-sec. rails.	13.25 to 13.75
Railroad springs.	14.00 to 14.50
Bundled sheets.	9.50 to 10.00
No. 2 R.R. wrought.	12.25 to 12.75
No. 1 busheling.	8.50 to 9.00
Cast bor. & turn.	4.00 to 4.50
Rails for rolling.	14.00 to 14.50
Machine shop turn.	4.00 to 4.50
Heavy turnings.	9.25 to 9.75
Steel car axles.	14.00 to 14.50
Iron car axles.	15.00 to 16.00
No. 1 R.R. wrought.	11.00 to 11.50
Steel rails under 3 ft.	14.25 to 14.75
Steel angle bars.	14.00 to 14.50
Cast iron carwheels.	11.75 to 12.25
No. 1 machinery cast.	10.75 to 11.25
Railroad malleable.	13.50 to 14.00
No. 1 railroad cast.	11.00 to 11.50
Stove plate.	7.50 to 8.00
Agricul. malleable.	12.50 to 13.00
Grate bars.	9.00 to 9.50
Brake shoes.	10.00 to 10.50

CINCINNATI

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. steel.	\$11.00 to \$11.50
No. 2 hvy. mltng. steel.	8.50 to 9.00
Scrap rails for mltng.	11.50 to 12.00
Loose sheet clippings.	6.25 to 6.75
Bundled sheets.	8.25 to 8.75
Cast iron borings.	4.50 to 5.00
Machine shop turn.	5.25 to 5.75
No. 1 busheling.	9.00 to 9.50
No. 2 busheling.	4.75 to 5.25
Rails for rolling.	12.00 to 12.50
No. 1 locomotive tires.	10.00 to 10.50
Short rails.	14.50 to 15.00
Cast iron carwheels.	11.50 to 12.00
No. 1 machinery cast.	12.00 to 12.50
No. 1 railroad cast.	11.25 to 11.75
Burnt cast.	7.75 to 8.25
Stove plates.	7.75 to 8.25
Agricul. malleable.	10.25 to 10.75
Railroad malleable.	12.50 to 13.00

DETROIT

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. steel.	\$11.50 to \$12.00
No. 2 hvy. mltng. steel.	10.50 to 11.00
Boring and turnings.	7.50 to 8.00
Long turnings.	7.25 to 7.75

Short shov. turnings.	\$8.25 to \$8.75
No. 1 machinery cast.	14.50 to 15.00
Automotive cast.	14.25 to 14.75
Hydraul. comp. sheets.	11.75 to 12.25
Stove plates.	8.00 to 8.50
New factory bushel.	10.50 to 11.00
Old No. 2 busheling.	6.50 to 7.00
Sheet clippings.	8.50 to 9.00
Flashings.	10.50 to 11.00
Low phos. plate scrap.	11.50 to 12.00

CANADA

Dealers' buying prices per gross ton:

	Toronto	Mon-treal
Hvy. melting steel.	\$7.50	\$7.00
Rails, scrap.	8.50	8.00
Machine shop turn.	4.00	4.00
Boiler plate.	7.00	6.00
Hvy. axle turnings.	4.50	4.00
Cast borings.	5.00	4.50
Steel borings.	4.00	4.00
Wrought pipe.	4.00	4.00
Steel axles.	8.50	9.00
Axles, wrought iron.	9.00	9.50
No. 1 machinery cast.	11.50	11.00
Stove plate.	7.50	7.00
Standard carwheels.	11.00	10.50
Malleable.	7.00	7.00
Shoveling steel.	6.50	6.00
Bushelings.	6.00	5.50
Compressed sheets.	6.50	6.00

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	\$14.75 to \$15.25
Hydraulic bundles.	14.50 to 14.75
Machine shop turn.	10.50 to 11.50

NEW YORK

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. steel.	\$9.75 to \$10.25
No. 2 hvy. mltng. steel.	8.75 to 9.25
Hvy. breakable cast.	10.00 to 10.25
No. 1 machinery cast.	10.25 to 10.75
No. 2 cast.	8.75 to 9.25
Stove plate.	6.75 to 7.25
Steel car axles.	13.00 to 13.50
Shafting.	14.00 to 14.50
No. 1 R.R. wrought.	9.00 to 9.50
No. 1 wrought long.	8.50 to 9.00
Spec. iron & steel pipe.	8.50 to 9.00
Forge fire.	7.50 to 8.00
Rails for rolling.	10.50 to 11.00
Short shov. turnings.	4.00 to 4.25
Machine shop turn.	4.00 to 4.25
Cast borings.	4.50 to 5.00
No. 1 blast furnace.	3.00 to 3.50
Cast borings (chem.).	9.50 to 10.50
Unprepar. yard scrap.	5.00 to 5.50

Per gross ton, delivered local foundries:

No. 1 machn. cast.	\$11.50
No. 1 hvy. cast cupola.	9.50
No. 2 cast.	8.00

Add 25c. to 50c. to above quotations to secure North Jersey prices.

BOSTON

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. steel.	\$8.90 to \$9.40
Scrap rails.	9.00 to 9.50
No. 2 steel.	8.00 to 8.40
Breakable cast.	9.25
Machine shop turn.	4.25 to 4.40
Bund. skeleton long.	7.80
Shafting.	14.00 to 14.25
Cast bor. chemical.	5.00 to 7.00

Per gross ton delivered consumers' yards:

Textile cast.	\$11.00 to \$12.00
No. 1 machine cast.	11.00 to 12.00
Stove plate.	9.00

EXPORT

Brokers' buying prices per gross ton:

New York, delivered alongside barges	
No. 1 hvy. mltng. steel.	\$10.00
No. 2 hvy. mltng. steel.	9.00
No. 2 cast.	\$8.00 to 8.50
Stove plate.	7.00 to 7.25
Rails (scrap).	10.50 to 11.00

Boston, on cars at Army Base or Mystic Wharf

No. 1 hvy mltng. steel.	\$11.00
No. 2 hvy. mltng. steel.	10.00
Rails (scrap).	11.25
Stove plate.	7.75
Machine shop turn.	5.50

New Orleans, on cars at

Stuyvesant Dock

No. 1 hvy. mltng. steel.	\$10.00 to \$10.50
No. 2 hvy. mltng. steel.	9.00 to 9.50

Los Angeles, on cars or trucks

at local piers	
No. 1 hvy. mltng. steel.	\$10.50 to \$11.00
Compressed bundles.	8.50 to 9.00

PRICES ON FINISHED AND SEMI-FINISHED IRON AND STEEL

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

F.o.b. Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham. Prices at Duluth are \$2 a ton higher, and delivered Detroit \$3 higher.

Per Gross Ton
Rerolling \$30.00
Forging quality 37.00

Sheet Bars

F.o.b. Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

Per Gross Ton
Open-hearth or Bessemer..... \$30.00

Skelp

F.o.b. Pittsburgh, Chicago, Youngstown, Buffalo, Coatesville, Pa., Sparrows Point, Md.

Per Lb.
Grooved, universal and sheared 1.80c.

Wire Rods

(Nos. 4 and 5)

Per Gross Ton
F.o.b. Pittsburgh or Cleveland.....\$38.00
F.o.b. Chicago, Youngstown or Anderson, Ind. 39.00
F.o.b. Worcester, Mass. 40.00
F.o.b. Birmingham 41.00
F.o.b. San Francisco 47.00
F.o.b. Galveston 44.00

BARS, PLATES, SHAPES

Iron and Steel Bars

Soft Steel

Base per Lb.
F.o.b. Pittsburgh 1.95c.
F.o.b. Chicago or Gary..... 2.00c.
F.o.b. Duluth 2.10c.
Del'd Detroit 2.10c.
F.o.b. Cleveland 2.00c.
F.o.b. Buffalo 2.05c.
Del'd Philadelphia 2.26c.
Del'd New York 2.30c.
F.o.b. Birmingham 2.10c.
F.o.b. cars dock Gulf ports... 2.35c.
F.o.b. cars Pacific ports..... 2.50c.

Rail Steel

(For merchant trade)

F.o.b. Pittsburgh 1.80c.
F.o.b. Cleveland, Chicago, Gary or Moline, Ill. 1.85c.
F.o.b. Buffalo 1.90c.
F.o.b. Birmingham 1.95c.
F.o.b. cars dock Gulf ports... 2.20c.
F.o.b. cars dock Pacific ports.. 2.35c.

Billet Steel Reinforcing

(Straight lengths as quoted by distributors)

F.o.b. Pittsburgh2.05c.
F.o.b. Buffalo, Cleveland, Youngstown, Chicago, Gary or Birmingham2.10c.
Del'd Detroit2.20c.
F.o.b. cars dock Gulf ports...2.45c.
F.o.b. cars dock Pacific ports..2.45c.

Rail Steel Reinforcing

(Straight lengths as quoted by distributors)

F.o.b. Pittsburgh1.90c.
F.o.b. Buffalo, Cleveland, Youngstown, Chicago, Gary or Birmingham1.95c.
F.o.b. cars dock Gulf ports...2.30c.
F.o.b. cars dock Pacific ports..2.30c.

Iron

F.o.b. Chicago1.80c.
F.o.b. Pittsburgh (refined)....2.10c.
Delivered New York2.05c.
Delivered Philadelphia2.10c.

Cold Finished Bars and Shafting*

Base per Lb.
F.o.b. Pittsburgh 2.25c.
F.o.b. Cleveland, Chicago and Gary 2.30c.
F.o.b. Buffalo 2.35c.
Del'd Detroit 2.40c.
Del'd eastern Michigan 2.45c.

*In quantities of 10,000 to 19,999 lb.

Plates

Base per Lb.
F.o.b. Pittsburgh 1.90c.
F.o.b. Chicago or Gary..... 1.95c.
Del'd Cleveland 2.095c.
F.o.b. Coatesville or Spar. Pt... 2.00c.
Del'd Philadelphia 2.09c.
Del'd New York 2.19c.
F.o.b. Birmingham 2.05c.
F.o.b. cars dock Gulf ports... 2.30c.
F.o.b. cars dock Pacific ports.. 2.45c.
Wrought iron plates, f.o.b. Pittsburgh 3.20c.

Floor Plates

F.o.b. Pittsburgh 3.45c.
F.o.b. Chicago 3.50c.
F.o.b. Coatesville 3.55c.
F.o.b. cars dock Gulf ports... 3.85c.
F.o.b. cars dock Pacific ports.. 4.00c.

Structural Shapes

Base per Lb.
F.o.b. Pittsburgh 1.90c.
F.o.b. Chicago 1.95c.
Del'd Cleveland 2.095c.
F.o.b. Buffalo or Bethlehem... 2.00c.
Del'd Philadelphia 2.115c.
Del'd New York 2.1625c.
F.o.b. Birmingham (standard) 2.05c.
F.o.b. cars dock Gulf ports... 2.30c.
F.o.b. cars dock Pacific ports.. 2.45c.

Steel Sheet Piling

Base per Lb.
F.o.b. Pittsburgh 2.25c.
F.o.b. Chicago or Buffalo..... 2.35c.
F.o.b. cars dock Gulf or Pacific Coast ports 2.70c.

RAILS AND TRACK SUPPLIES

F.o.b. Mill

Standard rails, heavier than 60 lb. per gross ton.....\$36.37½
Angle bars, per 100 lb. 2.55

F.o.b. Code Basing Points

Light rails (from billets) per gross ton\$35.00
Light rails (from rail steel) per gross ton 34.00

Base per 100 Lb.

Spikes 2.60
Tie plates, steel 1.90
Tie plates, Pacific Coast ports.. 2.00
Track bolts, to steam railroads.. 3.60
Track bolts, to jobbers, all sizes (per 100 counts) 70 per cent off list

Basing points on light rails are Pittsburgh, Chicago and Birmingham; on spikes and tie plates, Pittsburgh, Chicago, Buffalo, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; on tie plates alone, Steelton, Pa.; on spikes alone, Cleveland, Youngstown, Lebanon, Pa., Columbia, Pa., Richmond, Va.

SHEETS, STRIP, TIN PLATE,

TERNE PLATE

Sheets

Hot Rolled

Base per Lb.
No. 10, f.o.b. Pittsburgh.....1.95c.
No. 10, f.o.b. Gary 2.05c.
No. 10, del'd Detroit 2.15c.
No. 10, del'd Philadelphia 2.26c.
No. 10, f.o.b. Birmingham.....2.10c.
No. 10, f.o.b. cars dock Pacific ports2.50c.

Hot-Rolled Annealed

No. 24, f.o.b. Pittsburgh.....2.50c.
No. 24, f.o.b. Gary 2.60c.
No. 24, del'd Detroit 2.70c.
No. 24, del'd Philadelphia 2.81c.
No. 24, f.o.b. Birmingham.....2.65c.
No. 24, f.o.b. cars dock Pacific ports3.15c.
No. 24, wrought iron, Pittsburgh4.30c.

Heavy Cold-Rolled

No. 10 gage, f.o.b. Pittsburgh...2.60c.
No. 10 gage, f.o.b. Gary2.70c.
No. 10 gage, f.o.b. Detroit2.80c.
No. 10 gage, del'd Philadelphia..2.91c.
No. 10 gage, f.o.b. Birmingham..2.75c.
No. 10 gage, f.o.b. cars dock Pacific ports3.20c.

Light Cold-Rolled

No. 20 gage, f.o.b. Pittsburgh..3.05c.
No. 20 gage, f.o.b. Gary3.15c.
No. 20 gage, del'd Detroit.....3.25c.
No. 20 gage, del'd Philadelphia..3.36c.
No. 20 gage, f.o.b. Birmingham..3.20c.
No. 20 f.o.b. cars dock Pacific ports3.60c.

Galvanized Sheets

No. 24 gage, f.o.b. Pittsburgh..3.20c.
No. 24, f.o.b. Gary3.30c.
No. 24, del'd Philadelphia.....3.51c.
No. 24, f.o.b. Birmingham.....3.35c.
No. 24, f.o.b. cars dock Pacific ports3.80c.
No. 24, wrought iron, Pittsburgh4.95c.

Long Ternes

No. 24, unassorted 8-lb. coating f.o.b. Pittsburgh3.50c.
F.o.b. Gary3.60c.
F.o.b. cars dock Pacific ports..4.20c.

Vitreous Enameling Stock

No. 20, f.o.b. Pittsburgh3.05c.
No. 20, f.o.b. Gary3.15c.
No. 20, f.o.b. Birmingham.....3.65c.
No. 20, f.o.b. cars dock Pacific ports3.65c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh2.75c.
No. 28, Gary2.85c.
No. 28, cars dock Pacific ports.3.35c.

Tin Plate

Base per Box
Standard cokes, f.o.b. Pittsburgh district mill\$5.25
Standard cokes, f.o.b. Gary..... 5.35
Standard cokes, f.o.b. cars dock Pacific ports 5.90

Terne Plate

(F.o.b. Pittsburgh)

(Per Package, 20 x 28 in.)

8-lb. coating I.C.....\$10.00
15-lb. coating I.C..... 12.00
20-lb. coating I.C..... 13.00
25-lb. coating I.C..... 14.00
30-lb. coating I.C..... 15.25
40-lb. coating I.C..... 17.50

Hot-Rolled Hoops, Bands, Strips and Flats under ¼ In.

Base per Lb.
All widths up to 24 in., P'gh..1.95c.
All widths up to 24 in., Chicago.2.05c.
All widths up to 24 in., del'd Detroit2.15c.
All widths up to 24 in., Birmingham2.10c.
Cooperage stock, Pittsburgh...2.05c.
Cooperage stock, Chicago.....2.15c.

Cold-Rolled Strips*

Base per Lb.
F.o.b. Pittsburgh2.60c.
F.o.b. Cleveland2.60c.
Del'd Chicago2.895c.
F.o.b. Worcester2.80c.

* Carbon 0.25 and less.

Cold-Rolled Spring Steel

Pittsburgh and Cleveland Worcester
Carbon 0.25-0.50% 2.60c. 2.80c.
Carbon .51-.75 3.45c. 3.65c.
Carbon .76-1.00 4.95c. 5.15c.
Carbon Over 1.00 6.50c. 6.70c.

Fender Stock

No. 14, Pittsburgh or Cleveland.2.90c.
No. 14, Worcester3.30c.
No. 20, Pittsburgh or Cleveland.3.30c.
No. 20, Worcester3.70c.

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh and Cleveland.)

To Manufacturing Trade

	Per Lb.
Bright wire	2.40c.
Spring wire	3.05c.

Chicago prices on products sold to the manufacturing trade are \$1 a ton above Pittsburgh or Cleveland. Worcester and Duluth prices are \$2 a ton above, Birmingham \$3 above, and Pacific Coast prices \$9 a ton above Pittsburgh or Cleveland.

To the Trade

	Base per Keg
Standard wire nails	\$2.19
Smooth coated nails	2.10

	Base per 100 Lb.
Annealed fence wire	\$2.65
Galvanized fence wire	3.00
Polished staples	2.80
Galvanized staples	3.05
Barbed wire, galvanized	2.60
Twisted barbed wire	2.60
Woven wire fence, base column	58
Single loop bale ties, base column	51

Chicago and Anderson, Ind., mill prices are \$1 a ton over Pittsburgh base (on all products except woven wire fence, for which the Chicago price is \$2 above Pittsburgh); Duluth, Minn., mill prices are \$2 a ton over Pittsburgh except for woven wire fence, which is \$3 over Pittsburgh and Birmingham mill prices are \$3 a ton over Pittsburgh.

On wire nails, barbed wire and staples, prices at Houston, Galveston and Corpus Christi, Tex., New Orleans, Lake Charles, La., and Mobile, Ala., are \$6 a ton over Pittsburgh.

On nails, staples and barbed wire, prices of \$6 a ton above Pittsburgh are also quoted at Beaumont and Orange, Tex.

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

F.o.b. Pittsburgh only on wrought iron pipe.

Butt Weld	
In.	Steel Black Galv.
1/4	57
1/2	60
3/4	64 1/2
1	67 1/2
1 1/2	69 1/2
2	72
2 1/2	75
3	78
3 1/2	81
4	84
4 1/2	87
5	90
5 1/2	93
6	96
6 1/2	99
7	102
7 1/2	105
8	108
8 1/2	111
9	114
9 1/2	117
10	120
10 1/2	123
11	126
11 1/2	129
12	132
12 1/2	135
13	138
13 1/2	141
14	144
14 1/2	147
15	150
15 1/2	153
16	156
16 1/2	159
17	162
17 1/2	165
18	168
18 1/2	171
19	174
19 1/2	177
20	180
20 1/2	183
21	186
21 1/2	189
22	192
22 1/2	195
23	198
23 1/2	201
24	204
24 1/2	207
25	210
25 1/2	213
26	216
26 1/2	219
27	222
27 1/2	225
28	228
28 1/2	231
29	234
29 1/2	237
30	240
30 1/2	243
31	246
31 1/2	249
32	252
32 1/2	255
33	258
33 1/2	261
34	264
34 1/2	267
35	270
35 1/2	273
36	276
36 1/2	279
37	282
37 1/2	285
38	288
38 1/2	291
39	294
39 1/2	297
40	300
40 1/2	303
41	306
41 1/2	309
42	312
42 1/2	315
43	318
43 1/2	321
44	324
44 1/2	327
45	330
45 1/2	333
46	336
46 1/2	339
47	342
47 1/2	345
48	348
48 1/2	351
49	354
49 1/2	357
50	360
50 1/2	363
51	366
51 1/2	369
52	372
52 1/2	375
53	378
53 1/2	381
54	384
54 1/2	387
55	390
55 1/2	393
56	396
56 1/2	399
57	402
57 1/2	405
58	408
58 1/2	411
59	414
59 1/2	417
60	420
60 1/2	423
61	426
61 1/2	429
62	432
62 1/2	435
63	438
63 1/2	441
64	444
64 1/2	447
65	450
65 1/2	453
66	456
66 1/2	459
67	462
67 1/2	465
68	468
68 1/2	471
69	474
69 1/2	477
70	480
70 1/2	483
71	486
71 1/2	489
72	492
72 1/2	495
73	498
73 1/2	501
74	504
74 1/2	507
75	510
75 1/2	513
76	516
76 1/2	519
77	522
77 1/2	525
78	528
78 1/2	531
79	534
79 1/2	537
80	540
80 1/2	543
81	546
81 1/2	549
82	552
82 1/2	555
83	558
83 1/2	561
84	564
84 1/2	567
85	570
85 1/2	573
86	576
86 1/2	579
87	582
87 1/2	585
88	588
88 1/2	591
89	594
89 1/2	597
90	600
90 1/2	603
91	606
91 1/2	609
92	612
92 1/2	615
93	618
93 1/2	621
94	624
94 1/2	627
95	630
95 1/2	633
96	636
96 1/2	639
97	642
97 1/2	645
98	648
98 1/2	651
99	654
99 1/2	657
100	660
100 1/2	663
101	666
101 1/2	669
102	672
102 1/2	675
103	678
103 1/2	681
104	684
104 1/2	687
105	690
105 1/2	693
106	696
106 1/2	699
107	702
107 1/2	705
108	708
108 1/2	711
109	714
109 1/2	717
110	720
110 1/2	723
111	726
111 1/2	729
112	732
112 1/2	735
113	738
113 1/2	741
114	744
114 1/2	747
115	750
115 1/2	753
116	756
116 1/2	759
117	762
117 1/2	765
118	768
118 1/2	771
119	774
119 1/2	777
120	780
120 1/2	783
121	786
121 1/2	789
122	792
122 1/2	795
123	798
123 1/2	801
124	804
124 1/2	807
125	810
125 1/2	813
126	816
126 1/2	819
127	822
127 1/2	825
128	828
128 1/2	831
129	834
129 1/2	837
130	840
130 1/2	843
131	846
131 1/2	849
132	852
132 1/2	855
133	858
133 1/2	861
134	864
134 1/2	867
135	870
135 1/2	873
136	876
136 1/2	879
137	882
137 1/2	885
138	888
138 1/2	891
139	894
139 1/2	897
140	900
140 1/2	903
141	906
141 1/2	909
142	912
142 1/2	915
143	918
143 1/2	921
144	924
144 1/2	927
145	930
145 1/2	933
146	936
146 1/2	939
147	942
147 1/2	945
148	948
148 1/2	951
149	954
149 1/2	957
150	960
150 1/2	963
151	966
151 1/2	969
152	972
152 1/2	975
153	978
153 1/2	981
154	984
154 1/2	987
155	990
155 1/2	993
156	996
156 1/2	999
157	1002
157 1/2	1005
158	1008
158 1/2	1011
159	1014
159 1/2	1017
160	1020
160 1/2	1023
161	1026
161 1/2	1029
162	1032
162 1/2	1035
163	1038
163 1/2	1041
164	1044
164 1/2	1047
165	1050
165 1/2	1053
166	1056
166 1/2	1059
167	1062
167 1/2	1065
168	1068
168 1/2	1071
169	1074
169 1/2	1077
170	1080
170 1/2	1083
171	1086
171 1/2	1089
172	1092
172 1/2	1095
173	1098
173 1/2	1101
174	1104
174 1/2	1107
175	1110
175 1/2	1113
176	1116
176 1/2	1119
177	1122
177 1/2	1125
178	1128
178 1/2	1131
179	1134
179 1/2	1137
180	1140
180 1/2	1143
181	1146
181 1/2	1149
182	1152
182 1/2	1155
183	1158
183 1/2	1161
184	1164
184 1/2	1167
185	1170
185 1/2	1173
186	1176
186 1/2	1179
187	1182
187 1/2	1185
188	1188
188 1/2	1191
189	1194
189 1/2	1197
190	1200
190 1/2	1203
191	1206
191 1/2	1209
192	1212
192 1/2	1215
193	1218
193 1/2	1221
194	1224
194 1/2	1227
195	1230
195 1/2	1233
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196 1/2	1239
197	1242
197 1/2	1245
198	1248
198 1/2	1251
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199 1/2	1257
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200 1/2	1263
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201 1/2	1269
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202 1/2	1275
203	1278
203 1/2	1281
204	1284
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206	1296
206 1/2	1299
207	1302
207 1/2	1305
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215	1350
215 1/2	1353
216	1356
216 1/2	1359
217	1362
217 1/2	1365
218	1368
218 1/2	1371
219	1374
219 1/2	1377
220	1380
220 1/2	1383
221	1386
221 1/2	1389
222	1392
222 1/2	1395
223	1398
223 1/2	1401
224	1404
224 1/2	1407
225	1410
225 1/2	1413
226	1416
226 1/2	1419
227	1422
227 1/2	1425
228	1428
228 1/2	1431
229	1434
229 1/2	1437
230	1440
230 1/2	1443
231	1446
231 1/2	1449
232	1452
232 1/2	1455
233	1458

IRON AND STEEL WAREHOUSE PRICES

PITTSBURGH

	Base per Lb.
Plates	3.25c.
Structural shapes	3.25c.
Soft steel bars and small shapes	3.05c.
Reinforcing steel bars	3.05c.
Cold-finished and screw stock:	
Rounds and hexagons	3.50c.
Squares and flats	3.50c.
Hot rolled strip incl. 3/16 in. thick, under 24 in. wide	3.30c.
Hoops and bands under 1/4 in.	3.80c.
Hot-rolled annealed sheets (No. 24), 25 or more bundles	3.35c.
Galv. sheets (No. 24), 25 or more bundles	4.05c.
Hot-rolled sheets (No. 10)	3.05c.
Galv. corrug. sheets (No. 28), per square (more than 3750 lb.)	\$3.77
Spikes, large	3.10c.

Per Cent Off List

Track bolts, all sizes, per 100 count	60
Machine bolts, 100 count	65-5
Carriage bolts, 100 count	65-5
Nuts, all styles, 100 count	65-5
Large rivets, base per 100 lb.	\$3.65
Wire, black, soft ann'l'd, base per 100 lb.	2.90c.
Wire, galv. soft, base per 100 lb.	3.25c.
Common wire nails, per keg	2.35c.
Cement coated nails, per keg	2.35c.

On plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applies to orders of 400 to 999 lb.

*Delivered in Pittsburgh switching district.

CHICAGO

	Base per Lb.
Plates and structural shapes	3.30c.
Soft steel bars, rounds	3.10c.
Soft steel bars, squares and hexagons	3.25c.
Cold-fin. steel bars:	
Rounds and hexagons	3.65c.
Flats and squares	3.65c.
Hot-rolled strip	3.40c.
Hot-rolled annealed sheets (No. 24)	3.95c.
Galv. sheets (No. 24)	4.65c.
Spikes (keg lots)	3.70c.
Track bolts (keg lots)	4.70c.
Rivets, structural (keg lots)	3.80c.
Rivets, boiler (keg lots)	3.90c.

Per Cent Off List

Machine bolts	*65
Carriage bolts	*65
Lag screws	*65
Hot-pressed nuts, sq. tap or blank	*65
Hot-pressed nuts, hex. tap or blank	*65
Hex. head cap screws	87 1/2
Cut point set screws	75 and 10
Flat head bright wood screws	70
Spring cotters	55
Stove bolts in full packages	70
Rd. hd. tank rivets, 7/16 in. and smaller	57 1/2
Wrought washers	\$4.50 off list
Black ann'l'd wire per 100 lb.	\$3.95
Com. wire nails, 50 kegs or more	2.40c.†
Cement c't'd nails, 50 kegs or more	2.40c.†

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets, the base applies on orders of 400 to 999 lb. All prices are f.o.b. consumers' plants within the Chicago switching district.

*These are quotations delivered to city trade for quantities of 100 lb. or more. For lots of less than 100 lb., the quotation is 65 per cent off. Discounts applying to country trade are 70 per cent off, f.o.b. Chicago, with full or partial freight allowed up to 50c. per 100 lb.

†Prices for city and suburbs only.

NEW YORK

	Base per Lb.
Plates, 1/4 in. and heavier	3.50c.
Structural shapes	3.47c.
Soft steel bars, rounds	3.41c.
Iron bars, Swed. charcoal	6.75c. to 7.00c.
Cold-fin. shafting and screw stock:	
Rounds and hexagons	3.96c.
Flats and squares	3.96c.
Cold-rolled; strip, soft and quarter hard	3.36c.
Hoops	3.66c.

Bands	3.66c.
Hot-rolled sheets (No. 10)	3.15c. to 3.41c.
Hot-rolled ann'l'd sheets (No. 24*)	3.75c. to 3.99c.
Galvanized sheets (No. 24*)	4.10c. to 4.50c.
Long terne sheets (No. 24)	5.25c. to 5.35c.
Armco ingot iron, galv. (No. 24†)	5.65c.
Toncan iron, galv. (No. 24†)	5.65c.
Galvannealed (No. 24†)	5.75c.
Armco ingot iron, hot-rolled annealed (No. 24†)	5.10c.
Toncan iron, hot-rolled annealed (No. 24†)	5.10c.
Armco ingot iron, hot-rolled (No. 10†)	4.15c.
Toncan iron, hot-rolled (No. 10†)	4.15c.
Cold-rolled sheets (No. 20) less than 1000 lbs.	
Standard quality	4.65c.
Deep drawing	5.40c.
Stretcher leveled	5.40c.
SAE, 2300, hot-rolled	6.97c.
SAE, 3100, hot-rolled	5.37c.
SAE, 6100, hot-rolled, annealed	9.57c.
SAE, 2300, cold-rolled	8.03c.
SAE, 3100, cold-rolled, annealed	7.43c.
Floor plate 1/4 in. and heavier	5.30c.
Standard tool steel	11.25c.
Wire, black annealed (No. 9)	3.50c.
Wire, galv. (No. 9)	3.85c.
Tire steel, 1 x 1/2 in. and larger	3.75c.
Open-hearth spring steel	4.00c. to 10.00c.
Common wire nails, base per keg	\$3.21

Per Cent Off List

Machine bolts, square head and nut:	
All diameters	65 and 10
Carriage bolts, cut thread:	
All diameters	65 and 10
*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.	
†125 lb. and more.	

ST. LOUIS

	Base per Lb.
Plates and struc. shapes	3.55c.
Bars, soft steel (rounds and flats)	3.35c.
Bars, soft steel (squares, hexagons, ovals, half ovals and half rounds)	3.50c.
Cold-fin. rounds, shafting, screw stock	3.90c.
Hot-rolled annealed sheets (No. 24)	4.20c.
Galv. sheets (No. 24)	4.90c.
Hot-rolled sheets (No. 10)	3.40c.
Black corrug. sheets (No. 24)	4.20c.
*Galv. corrug. sheets	4.90c.
Structural rivets	4.00c.
Boiler rivets	4.10c.
Tank rivets, 7/16 in. and smaller	55
Machine and carriage bolts, lag screws, fitting up bolts, bolt ends, plow bolts, hot-pressed nuts, square and hexagon, tapped or blank, semi-finished nuts; all quantities	70

Per Cent Off List

*No. 26 and lighter take special prices.	
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PHILADELPHIA

	Base per Lb.
*Plates, 1/4-in. and heavier	3.10c.
*Structural shapes	3.10c.
*Soft steel bars, small shapes, iron bars (except bands)	3.15c.
†Reinforc. steel bars, sq. twisted and deformed	2.96c.
Cold-finished steel bars	3.91c.
*Steel hoops	3.55c.
*Steel bands, No. 12 and 3/16 in. incl.	3.30c.
Spring steel	5.00c.
†Hot-rolled anneal. sheets (No. 24)	3.75c.
†Galvanized sheets (No. 24)	4.50c.
*Hot-rolled annealed sheets (No. 10)	3.20c.
Diam. pat. floor plates, 1/4 in.	5.05c.
Swedish iron bars	6.25c.

These prices are subject to quantity differential except on reinforcing and Swedish iron bars.

*Base prices subject to deduction on orders aggregating 4000 lb. or over.

†For 25 bundles or over.

†For less than 2000 lb.

CLEVELAND

	Base per Lb.
Plates and struc. shapes	3.31c.
Soft steel bars	3.00c.
Reinforc. steel bars	2.10c.
†Cold-finished steel bars	3.65c.
Flat-rolled steel under 1/4 in.	3.36c.
Cold-finished strip	†3.00c.
Hot-rolled annealed sheets (No. 24)	3.91c.
Galvanized sheets (No. 24)	4.61c.
Hot-rolled sheets (No. 10)	3.11c.
Hot-rolled 3/16 in. 24 to 48 in. wide sheets	3.56c.
*Black ann'l'd wire, per 100 lb.	\$2.40
*No. 9 galv. wire, per 100 lb.	2.75
*Com. wire nails, base per keg	2.35

†Outside delivery 10c. less.

*For 5000 lb. or less.

CINCINNATI

	Base per Lb.
Plates and struc. shapes	3.52c.
Bars, rounds, flats and angles	3.32c.
Other shapes	3.47c.
Rail steel reinforc. bars	3.25c.
Hoops and bands, 3/16 in. and lighter	3.57c.
Cold-finished bars	3.87c.
Hot-rolled annealed sheets (No. 24) 25 bundles or more	4.62c.
Galv. sheets (No. 24) 500 lb. or less	4.47c.
Galvanized sheets (No. 24) over 3500 lb.	4.07c.
Hot-rolled sheets (No. 10)	3.32c.
Structural rivets	4.50c.
Small rivets	.55 per cent off list
No. 9 ann'l'd wire, per 100 lb. (1000 lb. or over)	\$2.88
Com. wire nails, base per keg: Any quantity less than carload	3.04
Cement c't'd nails, base 100-lb keg	3.50
Chain, lin. per 100 lb.	8.35

Net per 100 Ft.

Seamless steel boiler tubes:	
2-in.	\$20.37
4-in.	48.14
Lap-welded steel boiler tubes:	
2-in.	19.38
4-in.	45.32

BUFFALO

	Base per Lb.
Plates	3.48c.
Struc. shapes	3.35c.
Soft steel bars	3.15c.
Reinforcing bars	2.60c.
Cold-fin. flats and sq.	3.70c.
Rounds and hex.	3.70c.
Cold-rolled strip steel	3.19c.
Hot-rolled annealed sheets (No. 24)	4.16c.
Heavy hot-rolled sheets (3/16 in., 24 to 48 in. wide)	3.53c.
Galv. sheet (No. 24)	4.80c.
Bands	3.53c.
Hoops	3.53c.
Heavy top-rolled sheets	3.28c.
Com. wire nails, base per keg	\$2.85
Black wire, base per 100 lb. (2500-lb. lots or under)	4.00
(Over 2500 lb.)	3.90

BOSTON

	Base per Lb.
Beams, channels, angles, tees, zees	3.54c.
H beams and shapes	3.54c.
Plates—Sheared, tank, and univ. mill, 1/4 in. thick and heavier	3.56c.
Floor plates, diamond pattern	5.36c.
Bar and bar shapes (mild steel)	3.45c.
Bands 3/16 in. thick and No. 12 ga. incl.	3.65c. to 4.65c.
Half rounds, half ovals, ovals and bevels	4.70c.
Tire steel	4.70c.
Cold-rolled strip steel	3.245c.
Cold-finished rounds, squares and hexagons	3.90c.
Cold-finished flats	3.90c.
Blue annealed sheets, No. 10 ga.	3.65c.
One pass cold-rolled sheets No. 24 ga.	4.20c.
Galvanized steel sheets, No. 24 ga.	4.00c.
Lead coated sheets, No. 24 ga.	5.85c.

Price delivered by truck in metropolitan Boston, subject to quantity differentials.

DETROIT

Base per Lb.

Soft steel bars	3.19c.
Structural shapes	3.52c.
Plates	3.52c.
Floor plates	5.27c.
Hot-rolled annealed sheets (No. 24)*	4.04c.
Hot-rolled sheets (No. 10)**	3.24c.
Galvanized sheets (No. 24)....	4.82c.
Bands	3.49c.
Hoops	3.49c.
†Cold-finished bars	3.74c.
Cold-rolled strip	3.18c.
Hot-rolled alloy steel (S.A.E. 3100 Series)	5.44c.
Bolts and nuts, in cases, 70 and 10 per cent off list	
Broken cases	70 per cent off

Prices delivered by truck in metropolitan Detroit, subject to quantity differentials covering shipment at one time.

* Base, less 0.25c., 3500 lb. and over. Add 0.50c. per hundred lb. for broken bundles.

** Base less 0.25c., 1500 to 3749 lbs.; less 0.50c., 3750 to 7499 lb.; less 0.75c., 7500 lb. and over.

Galvanized and hot-rolled annealed may not be combined to obtain quantity deductions.

Country territory to be equalized on the Chicago plan.

MILWAUKEE

Base per Lb.

Plates and structural shapes..	3.41c.
Soft steel bars, rounds up to 8 in., flats and fillet angles....	3.21c.
Soft steel bars, squares and hexagons	3.36c.
Hot-rolled strip	3.51c.
Hot-rolled sheets (No. 10)....	3.16c.
Hot-rolled annealed sheets (No. 24)	4.06c.
Galvanized sheets (No. 20) ..	4.76c.
Cold-finished steel bars.....	3.61c.
Cold-rolled strip	3.38c.
Structural rivets (keg lots) ..	3.91c.
Boiler rivets, cone head (keg lots)	4.01c.
Track spikes (keg lots)	3.81c.
Track bolts (keg lots)	4.81c.
Black annealed wire	4.06c.
Com. wire nails	2.60c.
Cement coated nails	2.60c.

Per Cent Off List

Machine bolts, carriage bolts and lag screws	70 to 75
Hot-pressed nuts, sq. and hex. tapped or blank (keg lots)....	70

Prices given above are delivered Milwaukee.

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets, the base applies on orders of 400 to 9999 lb. On galvanized and No. 24 hot-rolled annealed sheets the prices given apply on orders of 400 to 1500 lb. On cold-finished bars the prices are for orders of 1000 lb. or more of a size.

ST. PAUL

Base per Lb.

Mild steel bars, rounds	3.35c.
Structural shapes	3.55c.
Plates	3.55c.
Cold-finished bars	3.90c.
Bands and hoops	3.65c.
Hot-rolled annealed sheets, No. 24	4.20c.
Galvanized sheets, No. 24....	4.90c.

On mild steel bars, shapes, plates and hoops and bands the base applies on 400 to 14,999 lb. On hot-rolled sheets, galvanized sheets and cold-rolled sheets base applies on 15,000 lb. and over. Base on cold-finished bars is 1000 lb. and over of a size.

BALTIMORE

Base per Lb.

*Mild steel bars	3.00c.
**Reinforcing bars	2.85c.
*Structural shapes	3.00c.
†Plates	3.00c.
†Hot-rolled sheets, No. 10....	3.10c.
†Hot-rolled annealed sheets, No. 24	3.60c.
†Galvanized sheets, No. 24....	4.30c.
*Bands	3.20c.
*Hoops	3.45c.
§Cold-rolled rounds	3.73c.
§Cold-rolled squares, hex. and flats	3.73c.
Rivets	4.40c.
Bolts and nuts, per cent off list	60 and 10

*Quantity extras per size apply.

†Quantity extras per thickness apply. Hot-rolled quantity extras are: 2000 lb. and over, base: 1500 lb. to 1999 lb. add 15c. per 100 lb.; 1000 lb. to 1499 lb. add 30c.; 0 to 999 lb., add 50c.

‡25 bundles and over, base. For 1 to 9 bundles add 50c. per 100 lb.; for 10 to 24 bundles add 25c.

§Base for 1000 lb. and over. For 500 to 999 lb. add 25c. per 100 lb.; for 300 to 499 lb. add \$1.00; for 0 to 299 lb. add \$1.75; for combined order under 100 lb. add \$3.00.

**For orders 4000 lb. to 9999 lb. Add 15c. per 100 lb. for orders 2000 to 3999 lb.; add 65c. for orders less than 2000 lb.

CHATTANOOGA

Base per Lb.

Mild steel bars	3.46c.
Iron bars	3.46c.
Reinforcing bars	3.46c.
Structural shapes	3.66c.
Plates	3.66c.
Hot-rolled sheets No. 10.....	3.46c.
Hot-rolled annealed sheets No. 24*	3.41c.
Galvanized sheets, No. 24*....	3.96c.
Steel bands	3.71c.
Cold-finished bars	4.281c.

* Plus mill item extra.

MEMPHIS

Base per Lb.

Mild steel bars	3.57c.
Shapes, bar size	3.57c.
Iron bars	3.57c.
Structural shapes	3.77c.
Plates	3.77c.
Hot-rolled sheets, No. 10.....	3.57c.
Hot-rolled annealed sheets, No. 24	4.37c.
Galvanized sheets, No. 24	4.90c.
Steel bands	3.82c.
Cold-drawn rounds	4.04c.
Cold-drawn flats, squares, hexagons	6.04c.
Structural rivets	4.25c.
Bolts and nuts, per cent off list	65
Small rivets, per cent off list.	50

NEW ORLEANS

Base per Lb.

Mild steel bars	3.35c.
Reinforcing bars	3.50c.
Structural shapes	3.55c.
Plates	3.55c.
Hot-rolled sheets, No. 10	3.55c.
Hot-rolled annealed sheets, No. 24	4.35c.
Galvanized sheets, No. 24	4.95c.
Steel bands	3.95c.
Cold-finished steel bars	4.30c.
Structural rivets	4.25c.
Boiler rivets	4.25c.
Common wire nails, base per keg	\$2.65
Bolts and nuts, per cent off list	70

PACIFIC COAST

Base per Lb.

	San Fran- cisco	Los Angeles	Seattle
Plates, tank and			
U. M.	3.25c.	3.60c.	3.65c.
Shapes, standard	3.25c.	3.60c.	3.65c.
Soft steel bars..	3.25c.	3.60c.	3.80c.
Reinforcing bars, f.o.b. cars dock			
Pacific ports..	2.45c.	2.45c.	2.45c.
Hot-rolled an- nealed sheets (No. 24)	4.10c.	4.35c.	4.50c.
Hot-rolled sheets (No. 10)	3.35c.	3.70c.	3.85c.
Galv. sheets (No. 24 and lighter)	4.50c.	4.40c.	5.10c.
Galv. sheets (No. 22 and heavier)	5.00c.	4.60c.	5.10c.
Cold finished steel			
Rounds	5.80c.	5.85c.	6.15c.
Squares and hexagons .	7.05c.	7.10c.	7.40c.
Flats	7.55c.	7.60c.	8.40c.
Common wire nails—base per keg less carload	\$2.90	\$2.90	\$2.90

All items subject to differentials for quantity.

REFRACTORIES PRICES

Fire Clay Brick

Per 1000 f.o.b. Works

High-heat duty, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	\$45.00
High-heat duty, New Jersey....	50.00
High-heat duty, Ohio	40.00
Intermediate, Pennsylvania, Maryland, Kentucky, Mis- souri and Illinois	40.00
Intermediate, New Jersey.....	43.00
Intermediate, Ohio	35.00
Ground fire clay, per ton.....	7.00

Silica Brick

Per 1000 f.o.b. Works

Pennsylvania	\$45.00
Chicago District	54.00
Birmingham	\$48.00 to 50.00
Silica cement per net ton.....	8.00

Chrome Brick

Per Net Ton

Standard f.o.b. Baltimore, Plym- outh Meeting and Chester....	\$45.00
Chemically bonded f.o.b. Balti- more, Plymouth Meeting and Chester, Pa.....	45.00

Magnesite Brick

Per Net Ton

Standard, f.o.b. Baltimore and Chester, Pa.	\$65.00
Chemically bonded, f.o.b. Balti- more	55.00

Grain Magnesite

Per Net Ton

Imported, f.o.b. Baltimore and Chester, Pa. (in sacks).....	\$45.00
Domestic, f.o.b. Baltimore and Chester, in sacks.....	40.00
Domestic, f.o.b. Chewelah, Wash.	22.00

RAW MATERIALS PRICES

PIG IRON

No. 2 Foundry

F.o.b. Everett, Mass.; Bethlehem, Birdsboro and Swedeland, Pa., and Sparrows Point, Md.	\$20.50
Delivered Brooklyn	22.9289
Delivered Newark or Jersey City	21.9873
Delivered Philadelphia	21.3132
F.o.b. Neville Island, Sharpsville and Erie, Pa.; Buffalo; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago and Granite City, Ill.	19.50
F.o.b. Jackson, Ohio	21.25
Delivered Cincinnati	20.5807
F.o.b. Duluth	20.00
F.o.b. Provo, Utah	17.50
Delivered San Francisco, Los Angeles or Seattle	22.315
F.o.b. Birmingham*	15.50

* Delivered prices on southern iron for shipment to northern points are 38c. a ton below delivered prices from nearest northern basing point.

Malleable

Base prices on malleable iron are 50c. a ton above No. 2 foundry quotations at Everett, Eastern Pennsylvania furnaces, Erie and Buffalo. Elsewhere they are the same.

Basic

F.o.b. Everett, Mass.; Bethlehem, Birdsboro, Swedeland and Steelton, Pa., and Sparrows Point, Md.	\$20.00
Delivered Boston Switching District	20.50
Delivered Newark or Jersey City	21.4873
Delivered Philadelphia	20.8132
F.o.b. Buffalo	18.50
F.o.b. Neville Island, Sharpsville and Erie, Pa.; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago and Granite City, Ill.	19.00
Delivered Cincinnati	20.0807
Delivered Canton, Ohio	20.3482
Delivered Mansfield, Ohio	20.8832
F.o.b. Jackson, Ohio	20.75
F.o.b. Provo, Utah	17.00
F.o.b. Birmingham	14.50

Bessemer

F.o.b. Everett, Mass.; Bethlehem, Birdsboro and Swedeland, Pa.	\$21.50
Delivered Boston Switching District	22.00
Delivered Newark or Jersey City	22.9873
Delivered Philadelphia	22.3132
F.o.b. Buffalo and Erie, Pa., and Duluth	20.50
F.o.b. Neville Island and Sharpsville, Pa.; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago and Birmingham	20.00
Delivered Cincinnati	21.0807
Delivered Canton, Ohio	21.3482
Delivered Mansfield, Ohio	21.8832

Low Phosphorus

Basing points: Birdsboro, Pa., Steelton, Pa., and Standish, N. Y.	\$24.00
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Gray Forge

Valley or Pittsburgh furnace	\$19.00
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Charcoal

Lake Superior furnace	\$22.00
Delivered Chicago	25.2528

Canadian Pig Iron

Per Gross Ton

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75	\$21.00
No. 2 fdy., sil. 1.75 to 2.75	20.50
Malleable	22.50

Delivered Montreal

No. 1 fdy., sil. 2.25 to 2.75	\$22.50
No. 2 fdy., sil. 1.75 to 2.25	22.00
Malleable	22.50
Basic	22.00

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.	
Domestic, 80% (carload)	\$75.00

Spiegeleisen

Per Gross Ton Furnace	
Domestic, 19 to 21%	\$26.00
50-ton lots 3-mo. shipment	24.00
F.o.b. New Orleans	26.00

Electric Ferrosilicon

Per Gross Ton Delivered	
50% (carloads)	\$69.50
50% (ton lots)	77.00
75% (carloads)	126.00
75% (ton lots)	130.00

Silvery Iron

Per Gross Ton	
F.o.b. Jackson, Ohio, 6.00 to 6.50%	\$22.75
For each additional 0.5% silicon up to 12%, 50c. a ton is added.	

The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are \$1.25 a ton higher than at Jackson.

Manganese 2 to 3%, \$1 a ton additional. For each unit of manganese over 3%, \$1 a ton additional. Phosphorus 0.75% or over, \$1 a ton additional.

Bessemer Ferrosilicon

F.o.b. Jackson, Ohio, Furnace	
Per Gross Ton	
10.00 to 10.50%	\$27.75
10.51 to 11.00%	28.25
11.01 to 11.50%	28.75
11.51 to 12.00%	29.25
12.01 to 12.50%	29.75
12.51 to 13.00%	30.25
13.01 to 13.50%	30.75
13.51 to 14.00%	31.25
14.01 to 14.50%	31.75
14.51 to 15.00%	32.25
15.01 to 15.50%	32.75
15.51 to 16.00%	33.25
16.01 to 16.50%	33.75
16.51 to 17.00%	34.25

Manganese 2 to 3%, \$1 a ton additional. For each unit of manganese over 3%, \$1 a ton additional. Phosphorus 0.75% or over, \$1 a ton additional.

Base prices at Buffalo are \$1.25 a ton higher than at Jackson.

Other Ferroalloys

Ferrotungsten, per lb. contained W del., carloads	\$1.30
Ferrotungsten, lots of 5000 lb.	1.35
Ferrotungsten, smaller lots	1.40
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr per lb. contained Cr delivered, in carloads, and contract	10.00c.
Ferrochromium, 2% carbon	16.50c. to 17.00c.
Ferrochromium, 1% carbon	17.50c. to 18.00c.
Ferrochromium, 0.10% carbon	19.50c. to 20.00c.
Ferrochromium, 0.06% carbon	20.00c. to 20.50c.
Ferrovanadium, del. per lb. contained V	\$2.70 to \$2.90
Ferrocolumbium, per lb. contained columbium, f.o.b. Niagara Falls, N. Y.	\$2.50
Ferrocobaltititanium, 15 to 18% Ti, 7 to 8% C, f.o.b. furnace carload and contract per net ton	\$137.50
Ferrocobaltititanium, 17 to 20% Ti, 3 to 5% C, f.o.b. furnace, carload and contract, per net ton	142.50
Ferrophosphorus, electric, or blast furnace material, in carloads, f.o.b. Anniston, Ala., for 18% with \$3 unitage, freight equalized with Rockdale, Tenn., per gross ton	58.50
Ferrophosphorus, electric, 24% in carlots, f.o.b. Anniston, Ala., per gross ton with \$3 unitage, freight equalized with Nashville, Tenn.	75.00
Ferromolybdenum, per lb. Mo del.	95c.
Calcium molybdate, per lb. Mo del.	80c.
Silico spiegel, per ton, f.o.b. furnace, carloads	\$38.00
Ton lots or less, per ton	45.50
Silico-manganese, gross ton, delivered	
2.50% carbon grade	85.00
2% carbon grade	90.00
1% carbon grade	100.00

Note: Spot prices are \$5 a ton higher except on 75 per cent ferrosilicon on which premium is \$10 a ton.

ORES

Lake Superior Ores Delivered Lower Lake Ports

Per Gross Ton	
Old range, Bessemer, 51.50%...	\$4.80
Old range, non-Bessemer, 51.50%	4.65
Mesabi, Bessemer, 51.50%	4.65
Mesabi, non-Bessemer, 51.50%	4.50
High phosphorus, 51.50%	4.40

Foreign Ore

C.i.f. Philadelphia or Baltimore

Per Unit	
Iron, low phos., copper free, 55 to 58% dry Spain or Algeria	10.25c.
Iron, low phos., Swedish, average, 68½% iron	10.25c.
Iron, basic or foundry, Swedish, aver. 65% iron	9.50c.
Iron, basic or foundry, Russian, aver. 65% iron	Nominal
Man., Caucasian, washed 52%	26c.
Man., African, Indian, 44-48%	25c.
Man., African, Indian, 49-51%	26c.
Man., Brazilian, 46 to 48½%	24c.

Per Net Ton Unit

Tungsten, Chinese, wolframite, duty paid, delivered, nominal	16.00
Tungsten, domestic, scheelite delivered, nominal	16.00

Per Gross Ton

Chrome, 45% Cr ₂ O ₃ , lamp, c.i.f. Atlantic Seaboard (African)	\$17.50
45 to 46% Cr ₂ O ₃ (Turkish)	\$16.50 to 17.00
48% Cr ₂ O ₃ (African)	20.50
48% min. Cr ₂ O ₃ (Turkish)	19.25
Chrome concentrate, 50% and over Cr ₂ O ₃ , c.i.f. Atlantic ports	22.00
52% Cr ₂ O ₃ (Turkish)	21.75
48 to 49% Cr ₂ O ₃ (Turkish)	19.25

FLUORSPAR

Per Net Ton

Domestic, washed gravel, 85-5, f.o.b. Kentucky and Illinois mines, all rail	\$18.00 to \$20.00
Domestic, barge and rail	19.00
No. 2 lump, 85-5, f.o.b. Kentucky and Illinois mines	20.00
Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic ports, duty paid	21.50
Domestic No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines	35.00

FUEL OIL

Per Gal.

F.o.b. Bayonne or Baltimore, No. 3 distillate	4.25c.
F.o.b. Bayonne or Baltimore, No. 4 industrial	3.75c.
Del'd Ch'go, No. 3 industrial	5.00c.
Del'd Ch'go, No. 5 industrial	3.77c.
Del'd Cleve'd, No. 3 distillate	5.87½c.
Del'd Cleve'd, No. 4 industrial	5.75c.
Del'd Cleve'd, No. 5 industrial	5.00c.

COKE AND COAL

Coke

Per Net Ton

Furnace, f.o.b. Connelville Prompt	\$3.50 to \$3.65
Foundry, f.o.b. Connelville Prompt	4.00 to 5.75
Foundry, by-product, Chicago ovens	9.00
Foundry, by-product, del'd New England	11.50
Foundry, by-product, del'd Newark or Jersey City	9.65
Foundry, by-product, Philadelphia	9.38
Foundry, by-product, delivered Cleveland	9.75
Foundry, by-product, delivered Cincinnati	9.50
Foundry, Birmingham	6.50
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry, from Birmingham, f.o.b. cars docks, Pacific ports	14.75

Coal

Per Net Ton

Mine run steam coal, f.o.b. W. Pa. mines	\$1.50 to \$1.75
Mine run coking coal, f.o.b. W. Pa.	1.75 to 1.90
Gas coal, ¼-in. f.o.b. Pa. mines	2.00 to 2.25
Mine run gas coal, f.o.b. Pa. mines	1.80 to 2.00
Steam slack, f.o.b. W. Pa. mines	1.00 to 1.25
Gas slack, f.o.b. W. Pa. mines	1.20 to 1.45



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STEELS

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FERRO-ALLOYS

FERRO SILICON
ALL GRADES

FERRO CHROMIUM
HIGH CARBON

FERRO CHROMIUM
LOW CARBON

FERRO MANGANESE
SILICO MANGANESE

PITTSBURGH METALLURGICAL CO., Inc.

NIAGARA FALLS,

N.Y.



FABRICATED STEEL

... Lettings decline to 15,000 tons from 16,655 tons a week ago.

o o o

... New projects in small volume at 10,615 tons as against 20,730 tons last week.

o o o

... Plate awards call for only 685 tons.

NORTH ATLANTIC STATES

Winslow-Waterville, Me., 575 tons, State bridge, to Bethlehem Steel Co.

Milo, Me., 190 tons, State bridge, to Harris Structural Steel Co., Inc., Plainfield, N. J.

East Alburg-West Swanton, Vt., 150 tons, draw span, to Bethlehem Steel Co.

South Boston, 560 tons, Government housing project, to New England Structural Co., Everett, Mass.

New York, 940 tons, route No. 108, sections 10 and 11, in Queens Borough, to Bethlehem Steel Co.

Carthage, N. Y., 215 tons, National Paper Products Corp. building, to Gray Steel Corp.

Niagara Falls, 240 tons, Carborundum Co. building, to R. S. McManus Steel Construction Co., Buffalo.

Medina, N. Y., 120 tons, Heinz Co. warehouse, to Leach Steel Corp., Rochester, N. Y.

Lancaster, Pa., 265 tons, high school, to A. B. Rote, Lancaster.

McKeesport, Pa., 250 tons, addition for Fifth Sterling Co., to Bethlehem Steel Co.

Pottstown, Pa., 130 tons, Doehler Die Casting Co. building, to Truscon Steel Co.

Elizabethtown, Pa., 200 tons, Masonic Home building, to Bethlehem Fabricators, Inc., Bethlehem, Pa.

Wilmington, Del., 125 tons, St. Francis hospital annex, to Belmont Iron Works, Philadelphia.

Washington, 280 tons, highway bridge for District of Columbia, to American Bridge Co.

SOUTH AND SOUTHWEST

Logan, W. Va., 340 tons, boiler house for Appalachian Power Co., to American Bridge Co.

Brantley County, Ga., 230 tons, highway bridge, to Bethlehem Steel Co.

Sharkey County, Miss., 110 tons, bridge, to Vincennes Bridge Co., Vincennes, Ind.

Wichita Falls, Tex., 180 tons, Kress & Co. building, to J. B. Klein Iron & Foundry Co., Inc., Oklahoma City, Okla.

Mesa, Ariz., 230 tons, spillway and gates at Horse Mesa dam, to an unnamed bidder.

CENTRAL STATES

Ironwood, Mich., 105 tons, beams and columns, for Treasury Department, to Joseph T. Ryerson & Son, Inc.

Detroit, 140 tons, Detroit Steel Products Co. factory extension, to Taylor & Gaskin.

Lawrence County, Ohio, 605 tons, bridge, to Fort Pitt Bridge Works Co., Pittsburgh.

Toledo, Ohio, 330 tons, oil refining building, M. W. Kellogg Co., to Pittsburgh Bridge & Iron Co., Rochester, Pa.

Lake Bluff, Ill., 240 tons, State highway bridge, to American Bridge Co.

Beardstown, Ill., 1130 tons, lock and dam, Illinois River, to Independent Bridge Co.

New La Grange, Ill., 1125 tons, lock and dam on Illinois River, to Independent Bridge Co.

Chicago, 2200 tons, South Ashland Avenue bridge, to an unnamed bidder.

Chicago, 600 tons, flow control at mouth of Chicago River, to Bethlehem Steel Co.

Cody, Wis., 460 tons, highway bridge, United States Bureau of Public Roads, to Wisconsin Bridge & Iron Co., N. Milwaukee.

Antigo, Wis., 100 tons, Wolf River bridge No. 65, to Wausau Iron Works, Wausau, Wis.

Milwaukee, 375 tons, West Oklahoma Avenue subway, Milwaukee Electric Railway & Light Co., to Milwaukee Bridge Co.

Stratford, Iowa, 270 tons, highway bridge, to Pittsburgh-Des Moines Steel Co.

St. Louis, 160 tons, repairs to Kings-highway bridge over Wabash tracks, to Stupp Brothers Bridge & Iron Co., St. Louis.

Fremont, Neb., State highway bridges, 1200 tons, to American Bridge Co.

WESTERN STATES

Clear Creek County, Colo., 208 tons, three State bridges, to unnamed bidders.

Los Angeles, 150 tons, crane runway for Columbia Steel Co., to Consolidated Steel Corp.

NEW STRUCTURAL STEEL PROJECTS

NORTH ATLANTIC STATES

Concord, N. H., 130 tons, overpass.

Newark, N. J., 160 tons, St. Barnabas Hospital building.

Crawford County, Pa., 780 tons, bridge; J. Lee Plummer, Sewickley, Pa., general contractor.

Middlesex County, N. J., 130 tons, highway bridge; bids Aug. 17.

Armstrong County, Pa., 146 tons, bridge; bids Aug. 14.

McKean County, Pa., 235 tons, bridge; bids Aug. 14.

THE SOUTH

Summerville, Tenn., 3200 tons, transmission towers for TVA.

CENTRAL STATES

State of Michigan, 1300 tons, bridges.

Detroit, 900 tons, building for Kelvinator Corp.

Saugatuck, Mich., 800 tons, State highway bridge.

Cleveland, 300 tons, building for Plain Dealer Publishing Co.

Grasselli, Ind., 200 tons, storage bins for Grasselli Co.

Chicago, 450 tons, Diversey housing project.

Monsanto, Ill., 350 tons, boiler house for Monsanto Chemical Co.

Saverton, Mo., 2500 tons, dam No. 22 in Mississippi River; bids Aug. 18.

WESTERN STATES

Green River, Wyo., 212 tons, State underpass and approaches; bids opened Aug. 5.

Los Angeles, 20,000 tons, court house and post office; bids advanced to Sept. 15.

Los Angeles, 150 tons, for Treasury Department, Specification No. 816; bids opened.

Marysville, Cal., 380 tons, bridge for Southern Pacific Co.

Woodland, Cal., 1000 tons, sugar refinery.

FABRICATED PLATES

AWARDS

Elizabeth, N. J., 235 tons, Interstate Equipment Co., three tanks, to Graver Tank & Mfg. Co., East Chicago, Ind.

Los Angeles, 450 tons, water stops for Metropolitan Water District, to Consolidated Steel Corp.

NEW PROJECTS

Beaver Dam, Wis., 200 tons, water storage tank for municipal waterworks; bids soon. William Gergen, city clerk.

Tucumcari, N. M., 150 tons, Conchas dam for United States Engineers; bids about Sept. 10.

SHEET PILING

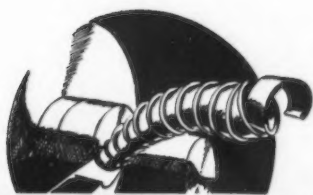
AWARDS

Salisbury, Md., 125 tons, Procurement Division, Treasury Department, to Carnegie-Illinois Steel Co.

Potholes, Cal., 150 tons, All-American Canal project, to Bethlehem Steel Co.

NEW PROJECTS

Saverton, Mo., 3000 tons, dam No. 22 in Mississippi River; bids Aug. 18.



THIS WEEK'S MACHINE ...TOOL ACTIVITIES...

... Order backlog spurs industrial training.

• • •

... Cincinnati is having a busy-shop summer.

• • •

... Drought results are being studied by railroads and agricultural implement makers.

By L. M. WAITE

DISTRIBUTION executives express much satisfaction with July sales. From general summation of inquiries, dealers are, apparently, well justified in expectations for a better than normal order showing for the month of August. Some manufacturers report a noticeable appearance of new manufacturing organizations, a number of which went into operation during July. There is in some sections a shortage of skilled workmen. Shop engineers of various types, mechanical draftsmen and designers, layout men, toolroom foremen and tool makers, machine operators and assemblers are in demand. While there is reported to be scattered gain against order backlog, the shortage of skilled shop help, plus a steady flow of individual orders, is said to have blocked improvement in delivery conditions up to the present time.

There is some expectation that the larger plants will again become active in buying during September, while a number of distributors hold that determination of definite political trend will cause a delay beyond September. Probability of continued single machine buying is generally conceded.

Cincinnati

Seasonal reactions are not in evidence in the Cincinnati machine tool market. Demand is unabated,

although large orders are absent. Light tools, for shipment to widely scattered domestic plants and to several European countries, are in steady demand. Orders for boring mills reflect continued interest. Planer companies report several sales during the month, but activity is still restricted on heavy tools. Contract planer work is increasingly active and at a good rate. Shapers and shears are moving in an encouraging manner, while orders for drills are sporadic. In one or two instances shops are operating night forces.

Chicago

The immediate concern of dealers here pertains to probable action by farm implement manufacturers who are concerned with ultimate drought extent. A number of these manufacturers are holding back equipment plans whereas others are keeping their projects on the active list. There is no indication that Allis-Chalmers Mfg. Co. will revise its Springfield, Ill., expansion program, although it has decided not to proceed with development work planned for Milwaukee.

Railroads in the drought area are giving "scrutiny to expenditures" and some active plans have been tabled for the time being.

On the brighter side of the market, a majority of dealers report July sales equal to those of June.

The vacation period appears to have cut new inquiries somewhat but the number of open proposals is large and for the most part these are considered alive.

Cleveland

Machine tool business in Cleveland territory continues good, volume in July being about equal to that of June. Lathes, shapers, planers and milling machines are in principal demand. Turret lathes fell only slightly below June, although quite a drop was expected. The Cleveland Hobbing Machine Co. during the week purchased four lathes. Other business includes two horizontal boring mills by a Cleveland dealer to a Detroit tool shop. Deliveries show no improvement and some tool manufacturers are losing orders thereby. The scarcity of skilled machinists is serving to open up apprentice schools which were discontinued during the depression.

Detroit

The July volume of orders showed a falling off as compared with June. Inquiries are extremely active and there seems to be a volume of miscellaneous business available. Dealer and factory representatives continue to be harassed because of the difficulty in meeting delivery promises on machinery sold several months ago. Many new orders are being placed on the basis of quick delivery; the delivery sheet is an important sales adjunct today. There is little hesitancy in buying standard machines on two weeks' delivery, but December or later is another story. Dealers look to a good volume of miscellaneous inquiries and orders throughout the remainder of the summer.

A manufacturer of steam hammer equipment has raised prices as of Aug. 5, following similar procedure by other makers.

Foreign

The importance of air programs is further attested by a recent 19-day tour from coast to coast by some 15 French aeronautical engineers. Groups visited leading engine and plane assembly plants and devoted considerable time to installations of modern machines and tools. Plants engaged in the production of parts utilized by aircraft manufacturers were carefully looked over. Some machine tool makers are said to have had opportunity for directing attention to peculiar merits of their machine methods.

Coke Saved, Hazard Reduced By Safety Blowpipe for Blast Furnaces

(CONCLUDED FROM PAGE 30)

ing of 100 lb. of coke for each ton of iron produced in 24 hr. For a 750-ton furnace this would amount to a saving of about 33.4 gross tons of coke per day or around \$133 per day.

However, as the tests on the blowpipe referred to above showed a saving of 110 deg., the fuel economy with the use of blow pipes saving that amount of temperature is estimated to be around \$70 per day.

If around 100 deg. of blast tem-

perature can be saved at the tuyeres and the scheduled blast furnace temperature at the tuyeres is still maintained, the stove temperature, it is pointed out, can be reduced an equal amount with considerable saving in gas consumption and reduced stove stack temperatures. Based on these figures it is claimed that the investment required for a set of 12 to 14 insulated blowpipes of average size could be written off in coke saving in one or two months of operation.

For Satisfactory Heat Treating Observe These Admonitions

(CONCLUDED FROM PAGE 31)

higher than if it is to blank lighter material.

If a piece is to be case-hardened, a good rule is to specify how deep a case is required. It is even better to designate whether the piece should be carburized, cyanided, or treated in some other manner. The

best and safest procedure depends largely upon the thickness of the piece, or the thickness of its weakest section, at least.

The terms "case harden" and "pack harden" ought really to be eliminated from trade use. Both are ambiguous, and lead to much

trouble. "Case harden" may mean any one of several processes. It is self-evident that when directions simply state "pack harden," the hardener cannot be sure whether he should carburize, or merely pack in a non-carburizing material for an entirely different reason.

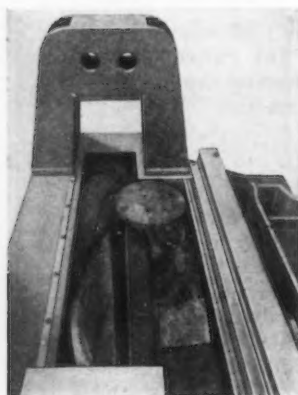
It is fundamentally wrong to ask for a case on material that exceeds, say, 0.25 carbon. Not only will high-carbon material refuse to take a case, but, if the piece hardens all through and is overheated at the temperature necessary for casing it, the result will be as brittle as an egg-shell. Moreover, since cased work seldom is drawn, such pieces often will break of their own accord. In this event, there will be no adjustment, because the evidence shows up clearly in the structure.

As regards treatment specifications, it is axiomatic that these will invariably be assiduously followed. Commercial steel treaters gladly carry them out to the letter, for they thus are relieved of all responsibility as to the outcome. It follows naturally, therefore, that in all such instances the specifier should be very sure of his ground. If he stipulates the degree of hardness that must be attained by treatment, it is reasonable to demand that he ascertain beforehand that his exactions are possible of fulfillment.

When a piece is to be designed with sharp corners, or "mean" sections, it is wise first to consider whether it ought to be made from oil-hardening, water-hardening, or other variety of steel. If doubt exists, the hardener should be questioned. In such a contingency, he may take time to give from his experience some added tips, such as putting in a fillet where it will strengthen the job, or drilling a tiny hole opposite a sharp corner, so that, if the material cracks at that point, the crack will travel only to the hole, leaving the piece as strong as ever.

The writer, in his experience, has never encountered a really good workman who did not want all the time possible to devote to a given job. In the case of annealing and hardening this is absolutely necessary, for never are good annealing jobs performed in a hurry. The longer the process of cooling, the better will be the result. Likewise, a good hardening job takes just so much time, re-

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ardless of any need for haste. The frequent desirability of at least one preheat and a draw, or better still a double draw, should make this clear. The more a piece is drawn at the correct temperature, the better the steel becomes.

Common sense should make it obvious that it is foolishness to take an expensive and laboriously manufactured die or tool out into the cold winter air, hand it to a steel treater, and expect him to put it in a furnace at heat and harden it while the customer waits. Naturally, the piece will not hold together, yet such requests are altogether too common.

Again, it should scarcely be necessary to stress the value of some kind of written order accompanying each job to the hardener, and not reaching him two or three or a longer number of days afterward. It should show (a) the proper count (or, if the count is not important, the "lot" and weight); (b) the correct make and grade of steel; (c) the name or number of the part, what it is for, or what it is to be used on; (d) the treatment desired. Specify, if desirable, the degree of hardness preferred, but leave enough leeway for variations in the carbon content of the steel.

In some cases, jobs for completion during the night do not reach the heat treater until after the customer's plant closes. For this reason, it is essential to make doubly sure that the hardener is given all possible information. The more data he has, the more intelligently will the work be performed. Customers who are fortunate enough to enjoy the services of a commercial heat treater who picks up and delivers work should realize that he does not always have a truck standing idle waiting for last-minute calls. If he is a competent steel treater he doubtless has other customers to serve, and if he is a good business man he routes his work so as to give the maximum in service at a cost within his limitations. Most of the time customers can anticipate their needs in this respect, and should phone in ahead of time.

Those who appreciate the kind of work a steel treater does for them and the kind of service he tries to render ought by all means to give a little thought to the many ways in which they can contribute toward improving that service.

Corrosion After Pickling Major Source of Galvanizer's Dross

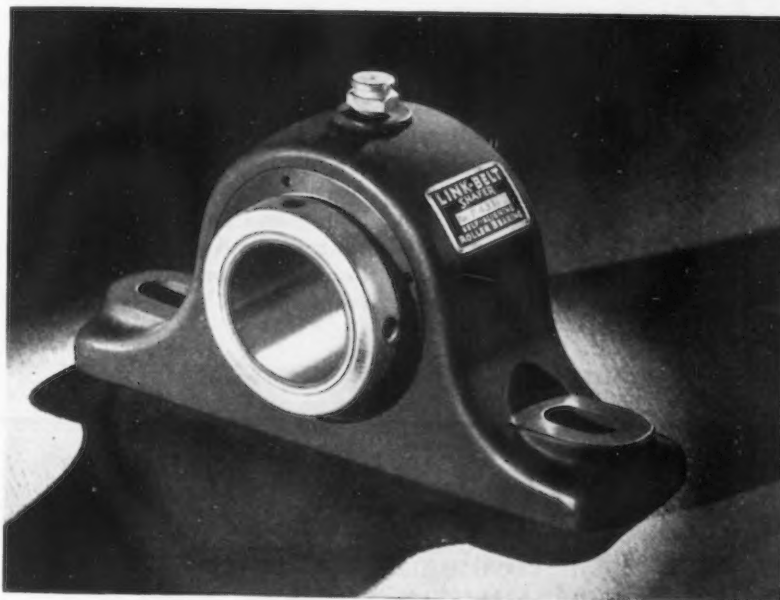
(CONTINUED FROM PAGE 37)

oxide of zinc is also found. Pure zinc oxide is white, but contamination with iron and other minor quantities of other metals gives it a green color.

(4) Attention is directed to the fact that oxidation of the zinc becomes marked at 1100 deg. F. so that if a galvanizing bath is overheated at night to 1100 deg. F.,

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IRON AGE

excessive dross and oxide result from this.

Melt at 1300 deg. F.

Fig. 5 shows what has happened when roll scale and zinc are heated together to a temperature of 1300 deg. F. The features of importance are as follow:

(1) The broken and mashed dross crystals.

(2) The large quantities of granular zinc-iron alloy.

(3) The large increase in the amount of the green oxide material which indicates that rapid oxidation of the zinc is taking place.

(4) Attention is also called to the black areas of the plate which show that there are still particles of undigested roll scale present even at this high temperature.

The photo to the left in Fig. 5 illustrates this point more clearly, namely, large areas of black undigested pieces of roll scale. The features of interest are as follow:

(1) The large particles of undigested roll scale in the center of the plate.

(2) The mass of broken dross crystals to be seen all over the entire field.

Melt at 1565 deg. F.

The photo shown in Fig. 6, at a temperature of 1565 deg. F., is far,

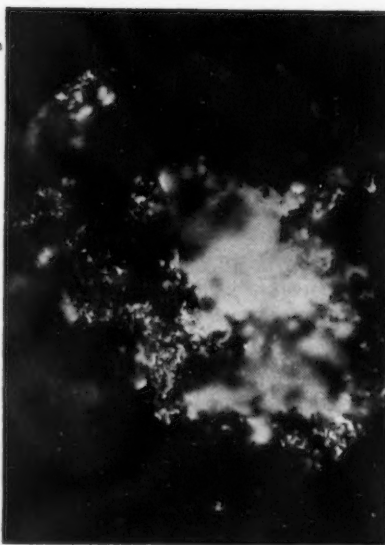


FIG. 6—Zinc and roll scale heated to 1565 deg. F. for 6 hr. and slowly cooled in the furnace over night. There is extremely rapid oxidation of zinc as demonstrated by the large amount of white and green zinc oxide formed. The melt was largely a mixture of dross crystals and this oxide powder.

far above the range of ordinary galvanizing bath temperatures. However, some galvanizing baths have risen to this temperature when overheated. Temperatures have been found so high that the galvanizing bath was red hot. It can be assured that at such temperatures the pot is being rapidly de-

stroyed, the zinc is being overheated and rendered worthless, the formation of dross is exceedingly rapid, and oxidation of the zinc at the surface of the bath is going on rapidly.

SUMMARY

For simplification, it is possible to condense all the experimental data found when zinc and ordinary roll scale are heated together at temperatures up to 1565 deg. F. These conclusions briefly are as follow:

(1) Zinc and ordinary roll scale react to form dross.

(2) The alloying action with roll scale is not as vigorous as with ferric oxide of iron, Fe_2O_3 , but appears to be greater than with magnetic oxide of iron, Fe_3O_4 .

(3) The introduction of iron into the zinc increases its hardness. Due to this hardness, these specimens were not as hard to saw in half as those of Research No. 2.

(4) Very minute dross crystals appear at 850 deg. F.

(5) There was practically no zinc-iron alloy at the bottom of these specimens.

(6) The alloying action with roll scale does not become intensely active until the temperature is over 900 deg. F.; at 950 deg. F. it is active; and at 1100 deg. F. it is intense.

(7) The following five distinct phases were found:

(a) From the melting point of zinc to 900 deg. F.

(b) From 900 deg. F. to 1100 deg. F.

(c) From 1100 deg. F. to 1300 deg. F.

(d) From 1300 deg. F. to 1500 deg. F.

(e) Above 1500 deg. F.

(8) At 1100 deg. F. and above the granular zinc-iron alloy was well developed.

(9) The beginning of the development of zinc oxide was noted at 1100 deg. F.

(10) At 1565 deg. F. the metal was almost completely oxidized and a porous matrix with dross crystals and white and green oxide remained.

(11) Increase of temperature causes the development of larger dross crystals.

(12) At 1300 deg. F. the zinc is oxidized very rapidly.

(13) Undigested roll scale parti-

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cles were found up to a temperature of 1300 deg. F.

The second phase of this series of experiments was to cut the specimens of the melt in half, and, as stated in the beginning, the one half was used for chemical analyses and the other was polished and prepared for observation under the microscope. The samples just described tell what was seen under the microscope. It is of interest to know what was found when the other halves of the melts were analyzed. The feature which tells the story is the iron content of the sample, but as is often found when research work has been done, it is not so easy to explain the results shown after the chemical analyses have been made.

The results of the chemical analyses of all the melts for all the series are listed in the accompanying table.

The facts in the table are very hard to explain. One question at once arises: "Are they experimental errors, or are they facts?" Before going into a discussion of this phase of the chemical analyses, attention is called to the following general principles discovered from an examination of all the chemical analyses.

(1) In all of the three researches an increase of iron content is noted with a rise of temperature.

(2) In all three researches the iron content increased most in the 50-deg. rise between 800 and 850 deg. F.

(3) While not conclusive from these tests, the rise in iron content seems to bear a direct relation to the rise in temperature, which might be roughly outlined as 1 to 2 per cent at 800 deg. F., 3 per cent at 850 deg. F., 4 per cent at 900 deg. F., and 5 per cent at 950 deg. F.

These percentages correspond very closely to the practical results as found in ordinary galvanizing dross at these same temperatures.

(4) On the same basis of an increase of 1 per cent iron content for every 50-deg. F. rise in temperature, the crystals formed would have been made at 1100 to 1150 deg. F. This corresponds to a point of very active chemical energy development of Research No. 1, and also seems to tie in with practical facts. For when an absolutely new galvanizing bath of 23 tons was overheated for only 4 hr. to 1100 deg. F., in that short time 4400 lb.

CHEMICAL ANALYSIS OF VARIOUS MIXTURES USED TO DETERMINE THE REDUCING ACTION OF MOLTEN ZINC

Temperature in Deg. F.	Research No. 1 Iron in Per Cent	Research No. 2 Iron in Per Cent	Research No. 3 Iron in Per Cent
800	0.99	1.33	2.39
850	3.03	2.94	7.26
900	3.70	4.03	5.98
950	4.75	4.13	4.80
Crystals	8.94	...	6.37

of dross resulted without one pound of production going through the pot.

(5) Attention is called to the results obtained when the total iron content of each series is added together up to temperatures of 950 deg. F. For Research No. 1, it is 12.47 per cent; for Research No. 2, it is 12.43 per cent; and for Research No. 3, it is 20.43 per cent. The first two researches differ only by 0.04 per cent iron, a really remarkable thing.

(6) The results of these investigations definitely show that the higher the temperature is raised, the more intense the reaction between the iron and the zinc becomes.

The final feature is to attempt to offer a logical explanation as to why the research on the action of

roll scale shows a much higher iron content than that found in Researches Nos. 1 and 2. There is a difference of about 8 per cent. It may be only due to experimental error, but a more logical explanation seems to be found in the fact that all roll scale carries much free iron that has been rolled up into the scale. This iron is immediately available to enter the zinc. Thus at 850 deg. F., the temperature of the zinc is high enough to quickly take up this easily available iron. When this has been taken up then the action is slowed down again to normal, when the iron has to be wholly obtained by reducing the roll scale. Whether this is the correct explanation, or whether it is just an experimental error is hard to say.

The practical interpretation of the results show:

(1) Corrosion after pickling is a major source of iron to form galvanizer's dross.

(2) Material that has not been fully pickled must remain in the galvanizing bath longer, and the bath temperature must be higher to break down the scale and iron oxides, and give a perfect coating.

(3) Dross crystals were produced in these experimental tests, demonstrating conclusively that the iron from corrosion is the same iron that is in the dross crystals.

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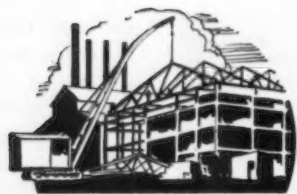
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PLANT EXPANSION AND EQUIPMENT BUYING

... Tubize Chatillon Corp., New York, has plans for additions to mills at Rome, Ga., and Hopewell, Va., to cost \$2,800,000 with equipment.

• • •

... American Brass Co., Waterbury, Conn., has approved an expenditure of \$150,000 for plant additions and equipment at Ansonia, Conn.

◀ NORTH ATLANTIC ▶

Public Works Division, Navy Yard, Brooklyn, Capt. Archibald L. Parsons, public works officer in charge, is arranging fund of \$4,000,000 through PWA for extensions and improvements at local yard, including one-story addition to structural shop, new shop unit to replace Building No. 37, one-story shop addition to service and garage building, remodeling and modernization of foundry and other work. Bids will be asked as soon as appropriations for different units are available.

Zophar Mills, Inc., 242 Lorraine Street, Brooklyn, manufacturer of refined oil products, waxes, etc., has leased property at 112-30 Twenty-sixth Street for expansion.

Tubize Chatillon Corp., 2 Park Avenue, New York, manufacturer of viscose rayon products, will have plans drawn by Robert & Co., Atlanta, Ga., architects and engineers, for additions to main mill at Rome, Ga., to increase present capacity 50 per cent; also for similar expansion at branch mill at Hopewell, Va. Entire project will cost about \$2,800,000 with equipment. Fund has been authorized. R. C. Jones is manager at Rome mill.

New York Central Railroad Co., 230 Park Avenue, New York, plans expansion at car shops at Ashtabula, Ohio, including addition to car-dismantling and demolishing shop for depreciated equipment and installation of machinery in this and other divisions.

Department of Purchase, City of New York, Municipal Building, plans equipment storage and distributing plant on Second Avenue, Thirty-third to Thirty-fifth Streets, Brooklyn. Cost close to \$400,000 with mechanical-handling and other equipment.

Royal Mfg. Co., 587 Hendrix Street, Brooklyn, manufacturer of drugs, chemical specialties, etc., has leased six-story factory at 38 Sixth Avenue, 50,000 sq. ft. floor space, for new plant, doubling present capacity.

Signal Corps Procurement District, Army Base, Fifty-eighth Street and First Avenue, Brooklyn, asks bids until Aug. 10 for one row of steel revolving bins, consisting of 14 complete units (Circular 16).

Tide Water Oil Co., 17 Battery Place, New York, plans bulk oil storage and distributing plant at Laconia, N. H. Cost over \$45,000 with steel tanks and other equipment.

Superintendent of Lighthouses, St. George, Staten Island, New York, asks bids

until Aug. 14 for 40,215 lb. open link wrought iron buoy chain (Proposal 51869); until Aug. 19, for 150 to 400 electric waterproof buoy lanterns (Proposal 51817).

Quartermaster, Military Academy, West Point, N. Y., asks bids until Aug. 10 for 31 galvanometers, condenser boxes, keys, 44 wheatstone bridges and other equipment (Circular 27).

McKesson & Robbins, Inc., 155 East Forty-fourth Street, New York, manufacturer of drug and chemical products, liquors, etc., has leased former plant of Osborne Co., Summer Avenue and Halleck Street, Newark, N. J., comprising four one and multi-story buildings with 100,000 sq. ft. floor space. It will be occupied by McKesson, Roeber & Kuebler Co., 368-70 Plane Street, Newark, a subsidiary, which will remove to new location and expand capacity. Structures will be remodeled and mono-rail conveying system, spiral gravity conveyors, steel bins, etc., installed, in addition to general machinery.

Commanding Officer, Ordnance Department, Picatinny Arsenal, Dover, N. J., asks bids until Aug. 11 for one electric furnace for bright annealing, carburizing and nitriding metal parts (Circular 34); until Aug. 12 for reworking 110,900 lb. brass turnings into same quantity of brass rod (Circular 45), one motor-driven triplex pump (Circular 44), one battery charger (Circular 43).

New Standard Baking Co., Ninth and Jefferson Streets, Philadelphia, plans new one-story plant. Cost close to \$100,000 with ovens, conveyors, mixers and other mechanical equipment. McCormick Co., 121 South Negley Avenue, Pittsburgh, is architect and engineer.

B. F. Goodrich Co., Akron, Ohio, has acquired factory property at Oaks, near Phoenixville, Pa., and will remodel for branch mill for initial output of about 400 tires per day.

◀ BUFFALO DISTRICT ▶

Binghamton Washing Machine Corp., Binghamton, N. Y., plans remodeling and improving plant with new equipment for replacements and expansion. Company is arranging financing to total about \$500,000, considerable part of fund to be used for purpose noted.

Haloid Co., Haloid Street, Rochester, N. Y., manufacturer of photographic papers and other processed paper stocks, plans two-story and basement addition.

Cost over \$50,000 with equipment. S. Firestone, 59 South Avenue, is architect and engineer.

General Plastics, Inc., North Tonawanda, N. Y., manufacturer of resinous products for use in plastics production, has let general contract to George W. Morris Corp., Jackson Building, Buffalo, N. Y., for one-story addition. Cost about \$50,000 with machinery.

United States Engineer Office, Federal Building, Buffalo, asks bids until Aug. 10 for 5200 ft. of 3/4-in., 3/4-in. and 1-in. wire rope (Circular 6); until Aug. 11, machine bolts, carriage bolts, nuts, etc. (Circular 7).

◀ NEW ENGLAND ▶

Schick Dry Shaver, Inc., 644 Atlantic Street, Stamford, Conn., manufacturer of electric-operated shaving machines and parts, has let general contract to Vuono Construction Co., 1 Atlantic Street, for three-story and basement addition, 63 x 135 ft. Cost over \$75,000 with equipment. Emmens & Abbott, Stamford, are architects.

Board of Selectmen, Town Hall, Barnardston, Mass., asks bids until Aug. 10 for pumping machinery and auxiliary equipment for new waterworks station. Weston & Sampson, 14 Beacon Street, Boston, are consulting engineers.

Imperial Beverage Co., Hamden, Conn., has plans for one-story mechanical bottling works, storage and distributing plant. Cost about \$45,000 with equipment. H. S. Cannici, 865 Chapel Street, New Haven, Conn., is architect in charge.

Chapman Machine Co., Terryville, Conn., manufacturer of screw machine products, parts, etc., has plans for one-story addition, 35 x 60 ft.

Boston Automatic Fire Alarm Co., 141 Milk Street, Boston, has let general contract to Sawyer Construction Co., 31 St. James Avenue, for six-story and basement storage and distributing plant, 50 x 60 ft. Cost over \$130,000 with equipment.

American Brass Co., Waterbury, Conn., has approved plans for two one-story additions to Upper Works at Ansonia, Conn., 75 x 380 ft., and 56 x 360 ft. Cost over \$150,000 with equipment.

◀ WASHINGTON DIST. ▶

Chemical Warfare Service, Edgewood Arsenal, Md., asks bids until Aug. 26 for one mechanical dryer, truck and tray type, with two complete sets of trucks and trays (Circular 10).

Auto-Cruiser Co., Inc., Hanover Street and Chesapeake Avenue, Baltimore, manufacturer of motor trailers and parts, plans main one-story unit and auxiliary buildings on York Road, where site has been acquired. Cost over \$45,000 with equipment. Roy J. Miller is head.

General Purchasing Officer, Panama Canal, Washington, asks bids until Aug. 10 for one sheet metal-working machine with one set of rolls, two electric arc welding machines, steam pressure gages, steam traps, check valves, 12 seven-circuit panel switchboards, two bronze propellers and other equipment (Schedule 3170); until Aug. 20, 10,000 lb. steel track bolts, 27,700 lb. steel rivets, 4100 lb. plate washers, 52,000 lock washers, 8300 steel lag screws, 18 brass melting crucibles, copper cable, rigid steel conduit, copper wire cloth, machinists' bench vises, steel machine bolts and other equipment (Schedule 3169).

Chesapeake & Ohio Railroad Co., Richmond, Va., plans extensions and improvements in coaling piers at Newport News, Va., including conveying, loading and other mechanical-handling equipment, bunkers, etc. Cost over \$300,000 with equipment.

Board of District Commissioners, District Building, Washington, asks bids until Aug. 10 for one bucket-type loading machine.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Aug. 11 for two 25-kw. motor-generator sets, with control panels (Schedule 8528) for Portsmouth Navy Yard; until Aug. 14, one motor-driven shaper (Schedule 8508), two motor-driven toolroom precision lathes (Schedules 8509, 8510), one 30-ton hydrau-

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lic forging press (Schedule 8511); until Aug. 18, propeller shafts (Schedule 8494) for Eastern and Western yards.

◀ SOUTH ATLANTIC ▶

Construction Service, Veterans' Administration, Washington, asks bids until Aug. 18 for complete diesel engine-generator set and accessories for installation at institution at Bay Pines, Fla.

Town Council, Screven, Ga., will soon take bids for pumping machinery and accessories, 60,000-gal. steel tank on 75-ft. tower and other equipment for waterworks. J. B. McCrary Co., Atlanta, Ga., is consulting engineer.

Bureau of Supplies and Accounts, Navy

Department, Washington, asks bids until Aug. 14 for one spot welding machine and one motor-generator set for Charleston, S. C., Navy Yard (Schedule 8516).

◀ SOUTH CENTRAL ▶

Bernheim Distilling Co., 1701 West Breckinridge Street, Louisville, has filed plans for 12-story addition for storage and distribution. Cost about \$125,000 with equipment.

United States Engineer Office, Vicksburg, Miss., asks bids until Aug. 10 for one gasoline engine-driven electric generating set (Circular 19); until Aug. 25 for 12 17-in., 18 16-in., and 12 15-in. diameter bronze propellers (Circular 24).

Refinoll Co., 1312-18 West Market Street, Louisville, has leased building, location noted, and will remodel for production of refined oil products. Cost over \$35,000 with equipment.

Nabors Trailer Mfg. Co., Mansfield, La., operated by W. C. Nabors Co., manufacturer of motor trailers, parts, etc., has let general contract to Thomas Scott, Jackson, Miss., for one-story branch plant at Jackson, primarily for assembling. Cost about \$35,000 with equipment.

Director of Purchases, Tennessee Valley Authority, Knoxville, Tenn., asks bids until Aug. 12 for segmental valves, temporary lock gates and auxiliary equipment for Guntersville and Chickamauga locks; until Aug. 13 for permanent lock gates for Chickamauga dam.

◀ SOUTHWEST ▶

Board of Education, Library Building, Kansas City, Mo., George Tinker, secretary, plans addition to manual training shops at Southwest high school, and installation of new equipment, in connection with other expansion and improvements at school, entire project to cost \$190,000. Financing is being arranged through Federal aid. Plans also are under way for addition to school shops at Twenty-second and Charlotte Streets. Cost about \$40,000 with equipment. Charles A. Smith, Finance Building, and Nate W. Downes, same address, are architect and mechanical engineer respectively for both structures.

Hygrade Water & Soda Co., 657 Tower Grove Avenue, St. Louis, has let general contract to Fred Hof, 6602 Hoffman Avenue, for two-story and basement addition to mechanical-bottling works, storage and distributing plant, 45 x 150 ft. Cost over \$45,000 with equipment.

Farmer's National Grain Corp., Leavenworth, Kan., plans rebuilding local grain elevator recently destroyed by fire. Loss over \$400,000 with elevating, conveying, loading and other equipment. Main offices are in Board of Trade Building, Kansas City, Mo.

Blatz Brewing Co., 3117 Southwest Boulevard, Kansas City, Mo., has let general contract to Fogel Construction Co., Reliance Building, for one-story addition, 55 x 75 ft., for storage and distribution. Cost about \$40,000 with equipment. George Lehle, 111 West Washington Street, Chicago, is architect. Company headquarters are at Milwaukee.

McAllen Pipe & Supply Co., McAllen, Tex., oil well equipment, pipe, etc., plans one or more one-story additions, to double capacity of present works. Cost over \$60,000 with equipment.

◀ OHIO AND INDIANA ▶

Corcoran-Brown Lamp Co., 4890 Spring Grove Avenue, Cincinnati, manufacturer of automobile lamps, has let general contract to Austin Co., Cleveland, for one and two-story additions, 97 x 125 ft. Cost close to \$100,000 with equipment. Company is affiliated with Electric Auto-Lite Co., Toledo.

Willys-Overland Motors, Inc., Toledo, has been formed under Delaware laws, with authorized capital stock of \$6,350,000, to take over Willys-Overland Co., with local plant. Reorganized company plans early production of new model car and will expend about \$400,000 for tools, dies and other equipment.

Shellmar Products Co., Mount Vernon, Ohio, operating a paper-converting plant for production of cellophane specialties, has asked bids on general contract for one-story addition, 120 x 120 ft. Cost over \$85,000 with equipment. Althouse & Jones, Farmers' Bank Building, Mansfield, Ohio, are architects. Main offices of company are at 224 South Michigan Avenue, Chicago.

Cleveland Metal Bed Co., 4750 Warner Road, Cleveland, has leased about 70,000 sq. ft. in former plant of Foster Nut & Bolt Co., East Seventy-second Street and Wheeling & Lake Erie Railroad, for new plant. Present works will be removed to new location and capacity increased.

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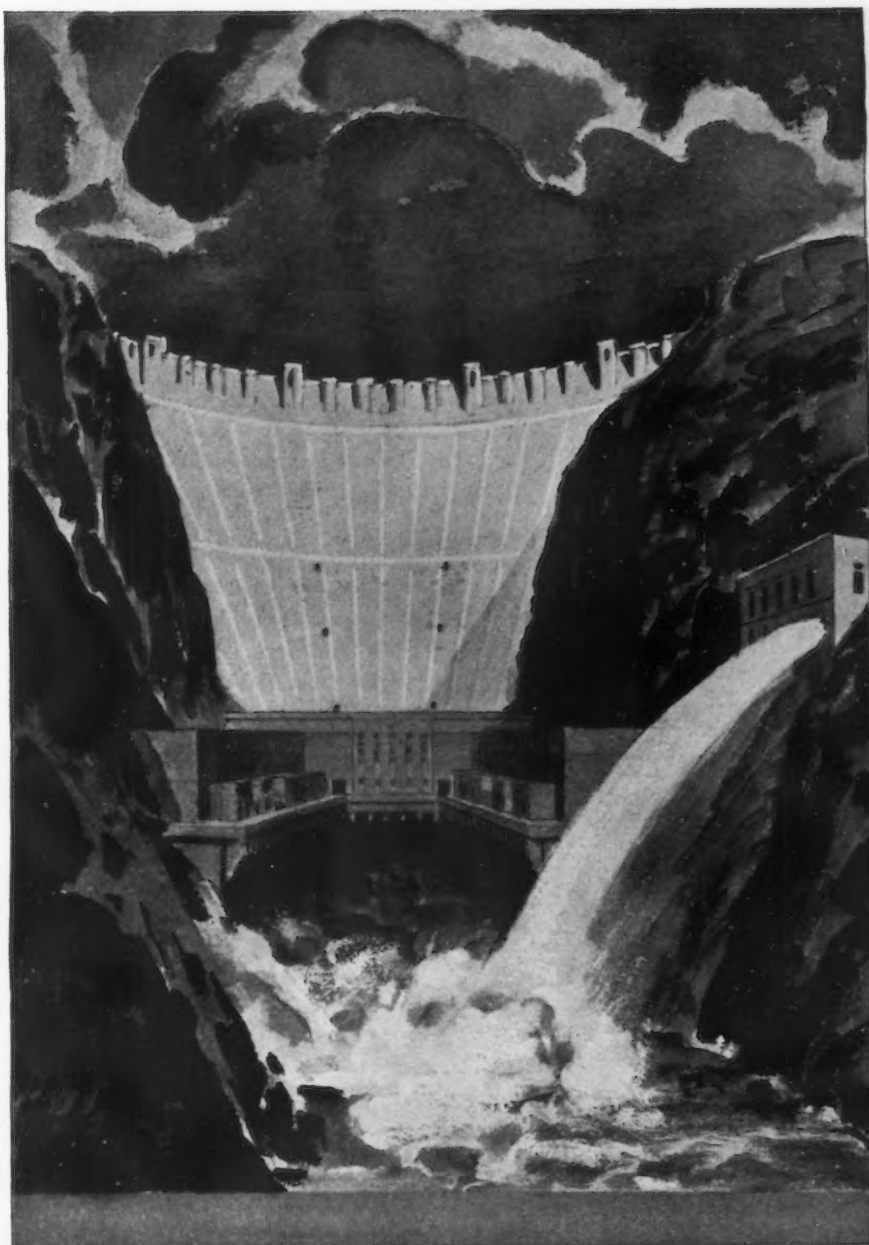
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THE IRON AGE, August 6, 1936—101

Ohio, asks bids until Aug. 13 for propeller hub cones, propeller hub rings, control assemblies, cable assemblies, propeller bolts, nuts, rings, cones, spacers and propeller hub retaining nuts (Circular 40); until Aug. 14, 2375 double-head box-type wrenches (Circular 56); until Aug. 17, speed indicators, altimeters, landing gear pressure gages, manifold pressure gages, oil and fuel pressure gages, thermocouple indicators, 3000 instrument lamps and other equipment (Circular 38); until Aug. 18, main fuel tank gage assemblies (Circular 49), 126 high-pressure, hand-operated air pumps (Circular 48).

Coca-Cola Bottling Co., 700 Meridian Street, Anderson, Ind., plans two-story addition to mechanical-bottling works, including storage and distributing facilities. Cost close to \$40,000 with equipment.

Indianapolis Railways, Inc., 110 North Illinois Street, Indianapolis, will take bids soon for motor bus service, storage and repair plant on West Washington Street, including one-story machine shop, 150 x 365 ft., one-story service unit, 70 x 225 ft., one-story storage and transfer building, 150 x 300 ft., and three-story and basement main transportation building. Cost over \$600,000 with equipment. Bevington-Williams, Inc., Indiana Pythian Building, is mechanical engineer.

◀ WESTERN PA. DIST. ▶

Mine Safety Appliances Co., 201 North Braddock Avenue, Pittsburgh, manufacturer of industrial safety equipment and appliances, has plans for four-story and basement addition, 65 x 175 ft. Cost over \$100,000 with equipment. Prack & Prack, Martin Building, are architects. George H. Deike is president.

Pittsburgh Plate Glass Co., Grant Building, Pittsburgh, will soon begin superstructure for one-story and basement factory branch, storage and distributing plant, 135 x 150 ft., at Fort Worth, Tex. Cost over \$85,000 with equipment.

American Bantam Car Co., Butler, Pa., recently organized by R. S. Evans and associates, to take over former plant of American Austin Co., defunct, has arranged for stock issue to total about \$900,000, part of proceeds for plant modernization and improvement, including equipment. Company will specialize in production of small commercial delivery trucks and pleasure automobiles. Mr. Evans is president, and Thomas L. Hibbard, vice-president.

◀ MICHIGAN DISTRICT ▶

Norge Corp., Muskegon, Mich., manufacturer of electric refrigerators and parts, a division of Borg-Warner Corp., Chicago, plans two additions, one story, 200 x 600 ft., and two stories, 112 x 125 ft., including improvements in present plant. First noted building will be used for storage and distribution, and two-story structure for general production. Cost over \$150,000 with equipment. Harry L. Spencer is manager at plant.

Macklin Co., Jackson, Mich., manufacturer of abrasive products, grinding wheels, etc., has let general contract to Arthur Moller, Jackson, for one-story addition, about 30,000 sq. ft. floor space, for expansion in electric oven division and other departments. Cost over \$50,000 with equipment.

Kraft Brewing Co., 1800 East Forest Street, Detroit, has let general contract to Alfred A. Smith, Penobscot Building, for multi-story addition to brewing plant. Cost close to \$100,000 with equipment. Jean C. Stuhler is president.

Postum Co., Battle Creek, Mich., a unit of General Foods Corp., 250 Park Avenue, New York, has plans for two additions, six stories, 156 x 200 ft., and five stories, 100 x 145 ft., for general production and general service department respectively, latter including machine shop, woodworking shop and other maintenance divisions. Cost close to \$1,000,000 with machinery. Work is scheduled to begin this month. H. W. Brown is plant manager.

Daisy Air Rifle Co., Plymouth, Mich., has let general contract to James A. Moyne's & Co., 901 West Milwaukee Avenue, Detroit, for one-story addition. Cost about \$45,000 with equipment.

◀ MIDDLE WEST ▶

Pyo's Foundry & Machine Co., 328 North Sangamon Street, Chicago, manufacturer of cast iron pulleys and other iron castings, has let general contract to Gerstein & Teitelbaum, 3618 West Haddon Avenue, for one-story machine shop and improvements in foundry. Cost over \$35,000 with equipment. Eugene and Max Fuhrer, 188 West Randolph Street, are architect and engineer respectively.

United States Gypsum Co., 300 West Adams Street, Chicago, manufacturer of building products, has let general contract to Campbell, Lowrie & Lautermilch Co., 400 West Madison Street, for one-story addition to factory branch, storage and distributing plant at St. Joseph, Mo. Cost over \$40,000 with equipment. Company is also planning a similar addition to factory branch at Hermosa, Ill., to cost close to like sum.

Vacuum Machinery Co., Atwood Street, Rockford, Ill., manufacturer of special machinery and parts, has let general contract to Security Building Co., 717 East Jefferson Street, for one-story addition, 80 x 120 ft. Cost close to \$45,000 with equipment.

Milwaukee Road, Union Station, Chicago, has asked bids on general contract for new engine house and repair shop for locomotives at Austin, Minn. Cost over \$60,000 with equipment.

John Morrell & Co., Ottumwa, Iowa, meat packers, have let general contract to W. A. Klinger, Inc., Warnock Building, Sioux City, Iowa, for two additions, four stories and basement, 50 x 130 ft., and two stories and basement, 60 x 60 ft., also improvements in present plant. Cost close to \$125,000 with equipment. H. Peter Henschien, 59 East Van Buren Street, Chicago, is architect and engineer.

Phoell Mfg. Co., 5700 West Roosevelt Road, Chicago, manufacturer of bolts, nuts, rivets, etc., has let general contract to Morris Handler Co., Inc., 2718 West Chicago Avenue, for one-story addition, 75 x 300 ft. Cost close to \$100,000 with equipment. Alfred S. Alsechular, 28 East Jackson Boulevard, is architect.

Board of Vocational Education, Marinette, Wis., has engaged Derrick Hubert, local architect, to design new vocational institute, 132 x 207 ft., two stories and part basement. PWA application is pending. H. E. Munson is president of board.

Milwaukee Electric Tool Co., A. F. Siebert, president, has plans for first unit of new factory, 90 x 100 ft., one-story and part basement. Investment in building and equipment will be about \$30,000.

◀ PACIFIC COAST ▶

Stearman-Hammond Aircraft Corp., San Francisco, recently organized, care of Richard P. Gross & Co., 333 Montgomery Street, investment securities, has acquired tract at Mills Field, adjoining municipal airport, including several one-story buildings, and will remodel for production of special type airplanes, including parts manufacture and assembling. Company is arranging financing through sale of stock to total about \$250,000, considerable part of fund to be used for purpose noted. Officials of new company will include Lloyd Stearman and Dea B. Hammond.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Aug. 14 for seamless copper tubing (Schedule 8517); until Aug. 18, copper-nickel alloy tubing (Schedule 8522) for Mare Island and Portsmouth Navy yards.

Wright Winery & Distillery Co., 3317 Colby Avenue, Everett, Wash., plans extensions and improvements in winery at Grandview, Wash., comprising main unit, 60 x 120 ft., and smaller structures. Cost over \$40,000 with equipment. Harry G. Hammond, 125 Queen Anne Avenue, Seattle, is architect.

Standard Trailer Co., Elmhurst, near San Leandro, Cal., manufacturer of motor trailers and parts, operated by Bill Brothers, plans one-story plant at San Leandro, 50 x 125 ft., for parts production and assembling. Cost about \$45,000 with equipment.

National Wine Co., 319 Nickerson Street, Seattle, plans one-story addition, 85 x 100

ft., and installation of fermenting machinery, bottling equipment, material-handling and other equipment. Cost close to \$50,000 with machinery. Carl Siebrand, 5016 Twenty-first Avenue, N.E., is architect.

◀ FOREIGN ▶

Blythswood Shipbuilding Co., Ltd., Scotstoun, Glasgow, Scotland, plans extensions and improvements in shipbuilding and repair plant, including new shops and other buildings, with mechanical-handling equipment, etc. Cost over \$500,000 with machinery.

Purchasing Department, County Council, Sydney, New South Wales, Australia, asks bids until Sept. 14 for 11,000-volt metal switchgear for power substations (Specification No. 51); until Nov. 2, complete steam generating plant, including boilers and accessories, for Bunnerong power station (Specification 55); also two 50,000-kw. steam turbo-alternator sets with auxiliary equipment for same power station.

Analyzing of Ores, Minerals, Etc.

It is often necessary to determine the minor constituents of minerals, rocks, ores, metallurgical products, etc. One of the best physical methods of quantitative analysis of such non-conducting solids and powders is the spectrum analysis procedure, using a carbonyl arc cathode layer (Glimmschicht) developed by V. M. Goldschmidt and Dr. R. Mannkopf, and their co-workers at Gottingen. A book has been published describing the development of this rapid technique. Included is a coherent summary of the best testing methods as applied today in leading laboratories, with numerous line diagrams and curves and several photographs of the apparatus used. The book may be obtained from the publisher, Adam Hilger, Ltd., 98 Kings Road, London, England, for 5s. 8d. post free.

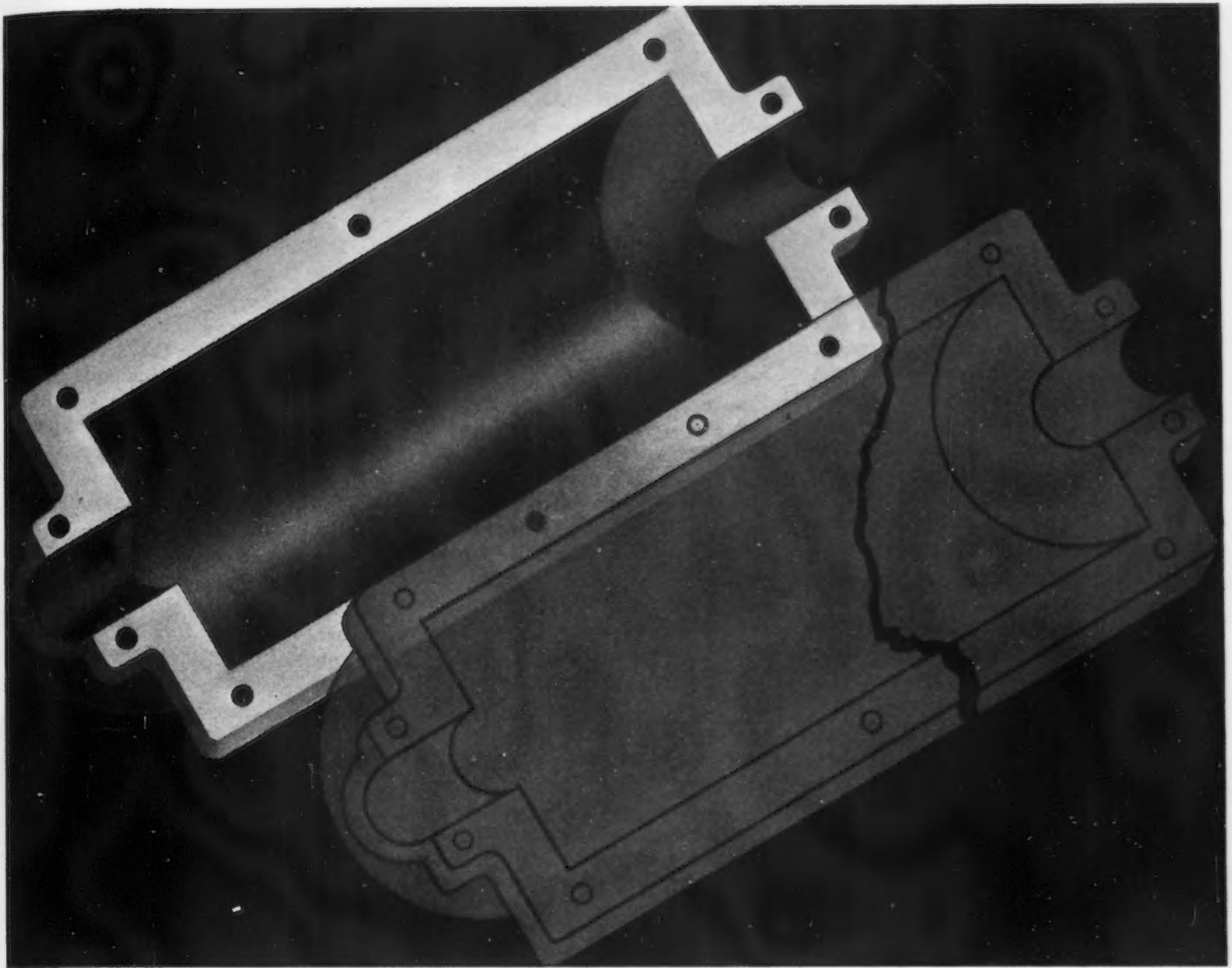
Refractories Division To Meet Sept. 4-5

The Refractories Division of the American Ceramic Society will hold its summer meeting at Bedford Springs, Pa., on Sept. 4 and 5. The program, of interest to operating men and others in the steel and glass industries, in addition to customary plant trips and entertainment features, will present the following papers:

J. D. Keller, research engineer, Carnegie Institute of Technology, "The Influence of Material, Shape and Size of Checker Brick on Regenerator Performance."

William C. Buell, Jr., consulting engineer, Cleveland (the author of "The Open Hearth Furnace"), "Performance of Checker Brick Under Various Operating Conditions. The speaker will discuss abuses in the design of open hearth regenerators which affect the performance of checker brick.

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Streamline Your Steel Castings

(CONCLUDED FROM PAGE 39)

tically uniform throughout will be found most satisfactory. There is less chance of internal defects. A given volume of molten steel will show a definite shrinkage after solidifying and cooling. This shrinkage must be allowed for in building steel casting patterns. Moreover, the designer must bear this in mind when he does his work. Certain metal shapes result in different shrinkage coefficients which means that for best results the steel foundryman, who has learned, from experience, these peculiarities of cast steel under varying conditions, should be consulted during the drafting board stage of casting design.

Adequate rigidity and strength can often be achieved without excessively heavy sections through the use of ribs or webs. But when two or more of these ribs or webs are allowed to come together at a common center, it usually spells trouble for the foundry. What actually happens is this: the center at which ribs or webs come together results in a local volume of metal considerably thicker than the surrounding sections. Unless these points can be fed with molten steel until they have solidified, the surrounding sections will solidify first and leave a nodus of liquid steel isolated from the source of supply of the feed metal. As it solidifies it undergoes shrinkage, and if there is no supply of liquid steel available to compensate, a so-called shrinkage cavity will be formed. Such cavities may not be detrimental in some instances, but in the case of critically stressed members, their presence would be unthinkable. That suggests another reason why the foundryman should work with the designer; the former will thus learn what the service requirements of the casting will be and the kind and direction of the stresses, if any, which it must withstand; the latter will learn what limitations are imposed by the casting process and how these may be overcome.

Figure No. 2 shows how ribs or webs can sometimes be staggered so as to avoid "hot spots" and resultant shrinkage cavities.

Figure No. 3 shows another method of preventing localized

"hot spots." In this instance a hole is provided at a point which avoids concentration of metal volume and at the same time in no way impairs the purpose and strength of the bracket web shown in the sketch.

One would normally think that the heavier the section, the stronger the casting. Within limits this is true. A notable exception, however, is illustrated in Figure No. 4. The sketch on the left shows what may happen if an attempt is made simply to add more metal at a point which is not directly fed with molten steel until it has solidified. The internal and external radii of a corner section should be measured from a common point or center as shown in the right hand sketch (Figure No. 4).

If the requirements are such that a strictly uniform wall thickness cannot be maintained and it is necessary to join heavy sections to lighter ones, this should always be accomplished by a gradual transitional taper. Abrupt changes of cross section are anathema to a conscientious foundryman. If the application will not permit of such transitional taper, it may be found entirely practical to produce two castings and weld them together. If an integral casting is essential, there remain certain means at the foundry's disposal which can be employed to bring about normal solidification, but such expedients (the use of chills, etc.) are not recommended unless absolutely necessary and seldom need be resorted to.

Castings lend themselves admirably to welded assembly since their characteristics are very similar to those of rolled steel. Then, too, the beveling, chamfering or notching necessary in preparing for the "laying in" of the weld metal can be provided in the pattern and the mold so that a minimum of grinding or machining is necessary in order to prepare them to be joined together or attached to rolled steel members.

Sharp corners are practically never encountered in a well-designed steel casting. If a sharp corner is essential it is usually

accomplished by machining, after the casting is made.

Where bosses are used in conjunction with cored holes it is good practice to "streamline" them in the manner illustrated in Figure No. 6, the object being always to maintain uniform wall section and avoid sharp corners. When uniform sections are impossible, as in the case illustrated, a compromise is the only practical answer.

The other sketches presented show in general, preferred methods for designing specific structural details. The closer the design adheres to preferred technique and the closer the designer works with the foundry, the better the resulting castings are likely to be.

Just a word about pattern equipment. Some foundries use one general type; others use different types. It is good practice to determine which foundry will produce the castings so that patterns best adapted to its use can be provided. A large percentage of the foundries have their own commercial pattern shops, manned by skilled craftsmen, fully acquainted with all factors vital to the production of highest quality steel castings. Even though the foundry is not permitted to make the pattern (a practice which will usually be found most satisfactory), it should be consulted as to the type of pattern it would like to have. Such precautions will reduce production delays to a minimum and will generally result in a better ultimate product.

Many designers and engineers have found from experience that it pays in the long run to work with the steel foundrymen from the rough sketch stage all the way through to the time the pattern is placed in the sand. The foundrymen are glad to give this service as it will often obviate major difficulties when later they are called upon to produce the castings.

KINGSTON-CONLEY ELECTRIC CO., manufacturer of fractional horsepower motors has acquired a new daylight factory building at 68 N. Brook Ave., North Plainfield, N. J. The floor area of the new plant is 25,000 sq. ft. The company will add a number of new types of motors to its line.